THE AMERICAN GAS LIGHT JOURNAL

REDMAN&KENNY,N.Y.

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXX. No. 12. Whole No. 1,502. | NEW YORK, MONDAY, MARCH 21, 1904. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager.
THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York.

Telephone.—2996 John.

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $5 (£1—25 francs). All payments to be made in advance. Single copies, 10 cents.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

Collections are invariably made directly from this office for subscriptions advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

Books.—We will forward by express, at publisher's lowest rates, any book—scientific or otherwise—to any address in the United States or Canada. We would suggest to our patrons that to avoid the risk and expense consequent on sending us the money (we do not send books C. O. D.), that orders for books be sent us through the Purchasing Department of the American Express Company.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

OFFICIAL—

Wanted by the Western Gas Association: A Man to Supervise the Association's Exhibit at the St. Louis World's Fair..... 441

Special Editorial Correspondence, by Telegraph—Twentieth Annual Meeting, Ohio Gas Light Association..... 441

EDITORIALS—

Briefly Told..... 442

Notes.

Thirty-fourth Annual Meeting, New England Association of Gas Engineers—Official Report—Revised by the Secretary—Continued from Page 409..... 443

First Day, Afternoon Session—Joint Discussion on the Paper by Mr. C. H. Gifford, on Inclines at New Bedford, Mass., and the Paper by Mr. C. F. Prichard, on Inclines as Used at Lynn, Mass.

Proceedings, Eleventh Annual Meeting, Michigan Gas Association—Revised by the Secretary—Continued from Page 413..... 447

First Day, Afternoon Session—Roll Call—Appointment of Special Committees—A Few Notes on Ammonia, by Mr. F. E. Sheriff—Discussion—*The Laying of High and Low Pressure (River) Gas Lines, by Mr. H. C. Morris—Discussion—Care of Benches and Results Therefrom, by Mr. T. J. Whalen—Discussion.

Address of Mr. John D. McIlhenny, President of the Ohio Gas Light Association, on the Occasion of Its Twentieth Annual Meeting..... 451

Some Patent Office Statistics, by Mr. F. Egner..... 452

A Union Engineering Building for New York..... 453

ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 453

Annual Meeting, Towanda, Pa.—Plant Improvements, Queens Borough Gas and Electric Company—Proposed Gas Works for Pendleton, Ore.—Cheaper Gas for Savannah, Ga.—Something from Nashville, Tenn.—An Odd "Complaint"—Repairing Damages, Baltimore Con. Co.—Capital Increase, Worcester (Mass.) Company—Something from Beaumont, Tex.—Cheaper Gas for Joliet, Ills.—Consolidation at Vincennes, Ind.—A Maryland Bill—Death of Mr. W. A. Goodman—Annual Meeting, Rome, N. Y.—The Bituminous Coal Situation and the Outlook Thereof—And Other Items.

The Market for Gas Securities..... 455

[OFFICIAL.]

Wanted by the Western Gas Association: A Man to Supervise the Association's Exhibit at the St. Louis World's Fair.

WESTERN GAS ASSOCIATION, OFFICE OF THE PRESIDENT,
1004 PENNSYLVANIA BUILDING,
PHILADELPHIA, PA., March 18, 1904.

The Western Gas Association desires to arrange with a suitable man to take charge of its technical exhibit of the gas industry in St. Louis during the 7 months' period of the Louisiana Purchase International Exposition, beginning May 1st. A young man familiar with gas practice is preferred, who will assume the responsible charge of the exhibits, explain such to visitors, caring for lamps and burners, operate the models, etc., etc. The time involved will be that of usual business hours, excluding Sundays. An attendant, for cleaning, etc., will be supplied by the Association. It is felt that such a position will be one of advantage and interest to whoever may hold it. Applications for such are requested immediately, and should be addressed to

F. H. SHELTON, President, Western Gas Association,
1004 Pennsylvania Building, Philadelphia, Pa.

[Special Editorial Correspondence, by Telegraph.]

THE TWENTIETH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HOLLENDEN HOTEL, CLEVELAND, O., March 18.

Dear JOURNAL: The Twentieth Annual Meeting of the Ohio Gas Light Association so far has been all that it promised to be from the indications shown in the preparations therefor. The initial attendance, when the meeting was called to order yesterday, in the Hollenden's handsome assembly hall, by President McIlhenny, was numerous and representative. The Association was welcomed in fitting terms by Mr. Malcolm S. Greenough, ex-President of the American Gas Light Association and President of the Cleveland Gas Light and Coke Company, and a very clever reply was made thereto by Mr. F. W. Stone, Vice-President of the Association. The reports of Secretary and Treasurer T. C. Jones, and of the Executive Committee as well, showed that the Association was prospering from every point of view. The number of new members elected reached the amazing total of 200.

President McIlhenny's address, which was a very brief document, called the attention of the members to the ravages caused by death in the ranks during the past twelvemonth. Four vacancies on the rolls were so created, and, strange to say, three were on the honorary list—notably on the sad record was the name of the Honorable Asa S. Bushnell, ex-President of the Springfield (O.) Gas Light and Coke Company, a staunch supporter of the Association, and famed in the business and political circles of Ohio and the Nation. The technical proceedings of the morning of the first day were closed by the reading and discussion of the useful paper, by Mr. J. J. Knight, of Kalamazoo, Mich., on "The Use of High Pressure Gas for Street Lighting."

The afternoon session was taken up with an interesting report from the "Progress Department," edited in his usual careful style, by Mr. Irvin Butterworth, of Detroit; the paper by Mr. J. T. Westcott, of

LIBRARY OF CONGRESS MAR 21 1904 SMITHSONIAN

London, England, on "Why English Gas Outputs are Large, with Lessons to be Drawn in the United States;" the "Wrinkle Department," which useful budget was prepared by Editor E. E. Eysenbach, of St. Paul, Minn.; the paper by Mr. Henry R. Cartwright, of Philadelphia, on the "Care of Station Meters;" and the report of the Committee on "Forms and Records," submitted by Vice-President Stone. The weather is cold and cloudy.

The "Smoker," given in the Hollenden last night was a genuine success, and reflected the greatest credit on the Committee whose careful efforts for their entertainment were thoroughly appreciated by the 225 guests who shared in its pleasures. The technical programme to-day (Thursday) was brimful of interest. Mr. W. A. Baehr, of St. Louis, contributed an excellent paper on the subject of "The Construction and Operation of Recuperative Benches;" Mr. C. H. Williams, of Madison, Wis., read his notes on "Burning Coke Breeze on Hollow Grates;" which was followed by the presentation of the subject of "Burning Coke Breeze with Underfeed Stokers," by Mr. M. E. Malone, of Madison, Wis. Then came the Question Box compilation by Editor H. L. Doherty, the discussion of which was put over until to-morrow. Next was the report of the Committee on Uniformity of Gas Meters, which was an exhaustive and seemingly complete investigation of the subject. In fact, its lines were so interesting that the debate thereon was only terminated by a set motion to end the same. The Committee was continued for another year. To-day is warm and rainy, but the ardor of the members in keeping up with the work of the Committee remains unabated.—J.

[Through some unexplained mixup in the transmission of the messages, we failed to receive anything concerning the meeting up to 3 P.M. of Friday, the 18th inst., the lateness of which hour precludes further mention of the meeting in this issue. The attendance at the convention was close to 200.—Eds.]

BRIEFLY TOLD.

NOTES.—

WITH much regret we announce the death of Mr. D. Lewis Bartlett, eldest son of Mr. E. L. Bartlett, senior member of the firm of Bartlett, Hayward & Co., of Baltimore, Md. His death which occurred at his home in Baltimore, the morning of February 22d, was the sad sequel to a sharp attack of pleuro pneumonia. Deceased was in his 36th year, having been born in Baltimore in 1868. For some years he had been in the active service of the firm, and at his death was its General Superintendent. He was an Associate Member of the American Gas Light Association since 1898, and was a frequent attendant at its meetings. His wife (nee Katharine Baldwin, of Baltimore) and two sons survive him. Interment was made in Greenmount Cemetery, Baltimore, the afternoon of February 24th.

RECENT welcome additions to our library are as follows: "Proceeding of the Ohio Gas Light Association," one Volume, which contains the records and transactions of the 17th, 18th and 19th meetings of the Association. The book is handsomely gotten up, as to illustrating, typography, paper and binding. The work was carefully edited by Mr. T. C. Jones, Secretary of the Association, and he is to be complimented on the masterly way in which he carried on and completed his laborious task.

A SECOND visitor is the "Gas World's" Analyses of Accounts of Gas Undertakings in the United Kingdom, compiled by Messrs. John Allan & Co., 3 Ludgate Circus Building, London. The book has to do with the annual accounts of 100 separate companies, 55 of which are under private control and 45 are in the hands of municipalities. In the subdivision 87 of the plants considered are in England, 12 are in Scotland and 1 is in Ireland. The analysis is carried out on a uniform plan, and the figures and tabulations are so arranged that one can easily, or without much stress, comprehend their teachings. It is a very valuable compilation.

A THIRD is the latest "Bulletin" issued by the Gas Machinery Company, of Cleveland, O. It is a handsomely gotten up volume, and the main matter treated in its pages has to do with "Gas Purifiers and Purification." The Company proposes to issue these "Bulletins" from time to time.

AT the annual meeting of the shareholders in the Atlanta (Ga.) Gas Light Company, many changes were made in its executive management, as the following list of those elected will show: Board of Directors, Messrs. J. Mecaslin, Robt. J. Lowry, Edward C. Peters, J. J. Spalding and W. L. Cosgrove; President, W. L. Cosgrove; Vice-President, P. S. Arkwright; Treasurer, G. W. Brice; Secretary, T. K. Glenn. It would look that these changes are positive proof that the Company's fortunes are pretty well bound up with those of the Georgia Railway and Electric Company.

A CORRESPONDENT in Cambridge, Mass., forwards the following, under date of March 16th.: "The offer of the Directors of the Cambridge Gas Light Company to stockholders of record January 27 of the privilege of subscribing for 800 additional shares of stock at $200 a share in the ratio of 1 new share for each 10, expired last week. The entire amount was taken by the stockholders. The first payment for the new stock was made the 10th inst., and the second of 50 per cent. is due August 10. Interest at the rate of 2 per cent. per annum will be allowed on the first payment, March 10 to April 1, but any subscriber has the privilege of making a full payment on March 10, therefore receiving the interest as above specified."

THE 19th annual report of the Board of Gas and Electric Light Commissioners of Massachusetts was presented to the Legislature on the 10th inst. While the document itself is not in our hands, the Massachusetts newspapers have had access to it, and the excerpts or resume here given are taken from the Springfield *Republican*, of the 11th inst.: "The report is largely made up of tables of statistics. There were 951 inspections of gas during the year, including those of gas supplied by municipal plants. Stationary photometers were installed at Attleboro, Newburyport, Pittsfield and Westfield. A page and a half is taken up with a table showing cases where inspections have shown deficiency of candle power, and another table is given to statements of excess of tabooed ingredients in the gas. Those go to show the difficulties which the companies labored under during the coal strikes to secure material fitted for their trading. The number of companies showing deficiency in candle power was 37, against 23 in 1902 and 6 in 1901. The average candle power, not including oil gas companies, was 17.91, against 18.6 in 1902 and 19.5 in 1901. The average candle powers of coal gas, 37 companies, was 17.45, against 17.29 and 18.09 in the two previous years; of water gas, 12 companies, 21.06, against 22.16 and 22.91, and of mixed coal and water gas, 15 companies, 18.76 against 19.15 and 19.66. The number of companies having sulphuretted hydrogen was 20, against 17 and 6; of excess of sulphur, 28, against 25 and 4; of excess of ammonia, 9, against 5 and 5. The average candle power of oil gas companies was 50.8, against 51.2 and 50.9. The number of companies showing sulphuretted hydrogen was 3, against 2 and 3. Nearly a page is taken up with a list of cases of violation of statutes by gas and electric light companies during the year. The municipal electric lighting plants had for the year 1903 a total income of $191,046, against $157,390 in 1902, expenses of $283,063, against $218,696, and an apparent loss in operating account of $92,016, against $61,306. The gas account of municipal plants shows for 1903: Income, $147,177; expenses, $100,895; apparent profit, $46,281, against 40,212 in 1902: Income, $57,441; expenses, $38,216; apparent profit, $19,224. A summary of the financial operations of all the companies in the State shows for 1903: Income, $9,542,940; expenses, $6,953,033; surplus, $735,476; for 1902, income, $7,968,098; expenses, $5,713,272; surplus, $703,073. Two of the companies appear not to have earned expenses and 26 others have not earned sufficient to warrant the declaration of any dividend. The receipts from gas sold by meter show an increase of $149,473. The receipts from sales for public lamps have increased by $5,722. The value assessed by the local assessors of the gas plants is $25,000,000. The average price paid by consumers for coal gas is $1.06 per 1,000, and for oil gas $4.62. The average for coal gas in 1902 was $1.07; in 1901, $1.08, in 1900, $1.10, and in 1899, $1.12. The average price has been gradually reduced from $1.72 in 1886."

Elec. World notes that a novel departure in the process of thawing out frozen water pipes is reported by the Storage Battery Supply Company, of 239 East 27th street, New York city. We give below a description of its process as adopted recently in thawing out pipes in Borough Park, Brooklyn. President T. D. Bunce says:

"Our method consists in taking a load of storage batteries, arranged for high amperage work with variable connections, adjustable for high amperage and low voltage on large pipes and low amperage on small pipes. In the present case we supposed the service pipe, which was ¾ inch in diameter, was all that was frozen, so we connected our feeders to the water main in the street and the outlet in the cellar of the party's house. The pipe was about 80 feet long and with about 15 volts and 300 amp.; we had raised the temperature of the service pipe to about 150°, where it was exposed in the cellar.

"We continued this for about 20 minutes, but no water came, so we concluded that the main was frozen, the party being the last man on it, and as the adjacent house had a supply of water we dug another hole and connected our feeders at this point and also at the first location on the mains in the street. This main was 2-inch galvanized pipe and the distance was about 20 feet. We used a pressure of 6 volts, but do not know how many amperes were used, as our meter did not read high enough. I presume it must have been in the neighborhood of 1,000 or more. From the time we threw on our current it required 3 minutes to have running water in the house."

[Official Report—Revised by the Secretary.—Continued from page 409.]

THIRTY-FOURTH ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Held in Young's Hotel, Boston, Mass., Feb. 18th and 19th, 1904.

First Day, Feb. 18—Afternoon Session.

Joint Discussion on the Paper, by Mr. C. H. Gifford, New Bedford, Mass., on "Inclines at New Bedford," and the Paper on "Inclines as Used at Lynn, Mass.," by Mr. C. F. Prichard.

[For the text of the Gifford and Prichard papers, see Journal, March 14, 1904, pp. 404 to 409.]

The President—We will take up the discussion of both these papers simultaneously. Mr. Bradley, will you kindly address the Association on the subject?

Mr. Bradley—I have little to add, because as a matter of fact Mr. Prichard's paper so well described my own experience in this line that I don't know I have very much to say. There are some little differences, of course. I can readily appreciate his difficulties; we had the same things. We started our inclines, I think, the middle of last summer—I won't undertake to give the date—and they ran along so nicely for several weeks that I really thought there was not much trouble about inclines; but suddenly they developed any amount of trouble in various ways, which necessitated our at once getting to work to make things right. I will say right here that many of my remarks will be on simple information and belief, because I don't nowadays spend as much time in the retort house as I used to, but intend that any information that I may give shall be absolutely reliable. We found that in starting up the benches it was necessary to be very careful, to avoid explosion in the bench, to charge the generator light, get the heats up so that the nostrils for the gases would get up to a red heat before filling the generator, then start and fill the generator above the take off. In that way we obviated all danger of explosion. We went on, as I say, for some little time, first putting in 4-hour charges. That developed some little trouble after a time. We could not burn the charges off in that time. We went to 5-hour charges; but it finally came down, as Mr. Prichard remarks, to 4-hour charges for the top and the middle retorts, and 6-hour charges for the bottom. We, however, are putting 1,000 pounds into the bottom retort instead of 850, as I think Mr. Prichard said.

Mr. Prichard—950.

Mr. Bradley—At present they are working very nicely. I don't think there is any question but that inclines have come to this country to stay, although I don't say that inclines are a cure for all the retort house ills that might be brought up. I should hesitate to prescribe inclines in every case. In investigating this subject a man must first understand the conditions under which he works and find out if inclines are adapted to his peculiar condition. There are many cases where inclines will work very nicely, and there are other cases where they won't work at all, entirely depending on the conditions of the place in which they are used. So far as the working of the inclines, our results are almost identical with Mr. Prichard's. We get slightly more gas per bench, I think. Our average per man runs between 60,000 and 70,000, the yield is from 4.85 to 4.95 from day to day, the candle power is the same as we would get from horizontals, the amount of coke is the same, the amount of tar is the same, the ammonia is the same, and the saving is entirely in the labor. At the present time, counting all the men in the retort house, from the man who brings the coal from the shed to the men who take the coke out—I will say right here that we are installing a hot coke conveyor, but haven't it in yet—there are 22½ men employed for 24 hours. We had trouble with the hydraulic main. That we cured in the same manner as Mr. Gifford told in his paper respecting New Bedford, by simply pumping weak ammoniacal liquor into the main. Since then we have had no trouble. There is a slight deposit of carbon just inside the mouthpiece at the lower end. That can be managed to a nicety by regulating the heats. We find it dangerous to carry a much higher heat near the mouthpiece than we do at the top, as it causes stopped standpipes. The carbon that deposits there is very readily removed. Twice a day, when the retort is open, we simply scrape it, and we are only obliged to throw off the retort for scurfing about once in 3 weeks. We had trouble with the slipping or creeping of the coal, but I think it is a very simple matter to avoid it. When we found out, or at least when we thought we found out, its cause, I could then tell why there was such a diverse opinion on that subject. I was on the other side of the ocean last summer, and among the engineers I then met there was the grratest diversity of opinion on that subject. There was some coal that could not be used at all; there was other coal that was better, and there was only a very small quantity of coal that could be used successfully. I will not mention any names for obvious reasons. One gentleman told me he was obliged to abandon the inclines because the coal slipped so that he could not use them. Another gentleman told me that he was using at the same time the same kind of coal from the same pit and it did not slip. And so it went, from one to another, and I was rather disturbed in mind about it. We use some 5 or 6 different kinds of coal, and I came at once to the conclusion that if I had to be tied up to one kind of coal it was hardly worth while to attempt to use inclines. Very much to my surprise, however, after we had been running a little while we discovered, or think we have, the cause of the slipping. All coal will slip if it is improperly used, and no coal will slip if it is properly used. That accounts for some coal slipping when the same coal would not slip on the other side. You must carry the heat in the inclines at the point where it will carbonize the maximum charge. The maximum charge in the retorts of our size and of Mr. Prichard's is about 750 to 800 pounds. If you put that charge of coal into the retorts it will never slip. If you reduce that charge to 400 pounds it will always slip. That is, I think, the solution of the slipping question. With that out of the way, one serious bugbear is disposed of. I do not know there is anything more I can add to this discussion just now. Perhaps if some of the other gentlemen will talk a little it may bring up new ideas, new thoughts; and I may be able to elucidate this subject a little further.

The President—Before you sit down, Mr. Bradley, will you state the cross section and length of the retort?

Mr. Bradley—The retorts that we are using now are 18 feet long by 15¾ by 23¾. They are of the German type, the Didier-Stettin. I might say right here that I have another range of 20-foot retorts, a little larger, of American production, that we are going to fire up within the next three or four weeks, and we shall be able to make some comparison as between our German friends and our own production.

The President—Mr. Bradley has transferred himself again from the honorary to the active list. Mr. Egner, will you contribute some data to this information?

Mr. Egner—Mr. President, I cannot contribute any recent data, because I have been practically out of business for about 5 years, but, as many of you will remember, at the St. Louis meeting of the American Gas Light Association I presented a paper, which you will find among the proceedings, and practically all these things which have been stated here to-day were stated then, 10 years ago. It almost knocks me speechless to have myself corroborated by the eminent talent that preceded me. I absolutely can hardly find words to express my gratification that I have been vindicated. I told the American gas engineers the truth 10 years ago, but they would not listen to it; they had to go see for themselves. Under the circumstances, my feelings almost overcome me; in fact, they pretty nearly do, and I will have to sit down. I would like to say a whole lot, but there are able men here who can talk. With such remarks as I have heard just now, I believe I had better stop right here.

The President—There must be a great many members who have questions for the people who can answer them, in connection with this subject.

Mr. Egner—I beg your pardon. I will say a little more about it now, as it might interest some, and it is to the point. Maybe some of you have not seen to what I refer. I live in the city of Washington, where is the home of the Patent Office. I go there occasionally and look at the files. I saw three patents there on inclined retorts, granted to Mr. W. R. Hering, of Edinburgh, Scotland. One had relation to the charging of retorts, the other to the drawing of retorts, and the third was a device to measure the charge of coal per retort. The improvement in charging retorts is, that his charging chute is so arranged that he can give it any incline; with a wheel underneath the chute he can give it any degree of incline desired very easily, even when in the act of charging the retort. Very fine coal can be shot in fast. Coarser coal can be given less of an inclination of the bottom of the charging shoe. It seems to be very simple, and it looks effective in the drawings. The drawing arrangement, however, has really got nothing to do with the drawing, except to receive the coke in a more convenient manner, when discharging a retort; and you can charge it into the furnaces or into the coke conveyor or coke cellar, and not have it roll all over the retort house floor. It enables the handling of the coke much better than I have seen it done before, and enables the stopper in the lower mouthpiece of the retorts to be taken off with much greater ease and safety and replaced with greater ease. These two improvements are

worth looking up by those who may employ inclined retorts. Then Mr. Bredel, of Milwaukee, who is not now in the room, has invented an improvement also. Last night he showed me a blue print describing his device, and it is worth considering in future installations of inclined retorts. He did not ask me to tell you gentlemen about it, and I am getting no commission, but I will tell you, because it may be interesting to know. He has an arrangement by which all the coal charged into each inclined retort is weighed, not measured. It is weighed just before charging, and it is apparently quite simple. I have no doubt that if he were in the room just now he would tell you about it himself, and try and sell you his invention. And it is an improvement over all other methods which I have seen so far, if it works as well as it looks, on paper, which Mr. Bredel said it did, as they had tried it.

Mr. Ramsdell—I don't know I have anything I could add to what has been said. It seems to me the matter has been laid very thoroughly and very properly before us. I think it is an exceedingly valuable thing that we have these statistics before us. It is the first time, as far as I know, that we have had any actual figures in any of our meetings—I mean of the actual results in this type of retort house practice; therefore I think they are exceedingly valuable, and particularly valuable from the fact that, as both of these gentlemen have said in their papers, they are the records for the first period of their work, when they were working under the very greatest disadvantages. I think that the figures showing up as well as they do speak very favorably for the system as a whole.

Mr. Bradley—To explain the matter a little further, I will say that I have a table here that was prepared for me, with the results of the month of January just closed. The total make was 35,750,000 feet; make per man, 77,380; make per retort, 21,360; make per pound, 4.82; retorts under fire, 54; retorts in use, 53.56. There was half a retort off through the month. The candle power was the same as produced frem the horizontals. I would say right here that our coal gas is all mixed with water gas before it is distributed. The make per foot of retort was 1,186 feet. The amount of coke used per 100 pounds of coal I have got in here somewhere; I cannot for the minute find it, but I think it is from 14 to 16 pounds. When I was coming away I had our engineer jot down some memorandums, and he made the memoranda about as long as the ordinary paper.

The President—Mr. Bradley mentioned one important item—that of candle power. I hope Mr. Prichard will answer by his data and state the candle power, or perhaps Mr. Gifford can give an estimate or measure. Mr. Norris, have you any data on this?

Mr. Norris—I have nothing to say, except that I was going to ask that very question in regard to candle power—whether Mr. Prichard had any means of judging whether the candle power is as high or higher than the same coal would have given with the ordinary horizontal retorts. I am under the impression that on the other side a good many engineers believe there is a slight falling off in candle power, and I have been wondering whether the same thing applies to our American coals.

Mr. Prichard—We are fitted up to measure the coal gas and water gas separately, but we have not as yet done it. We take our tests at the downtown office, where we supply a mixture of coal and water gas. I don't think there is any considerable difference; if there is any difference it may be a little lower in candle power, but we can't see that it is any lower. We are suffering, like the rest of the New England gas companies, from an epidemic of low candle power. Whether it is due to the coal gas, to the oil we are getting for making water gas, or the State Inspectors, I cannot tell. (Laughter). I can only say that, as everyone else is getting it, there is no reason to lay it to the inclines.

Mr. Egner—Before it is forgotten, I want to take exception to what Mr. Ramsdell said a few minutes ago. I think he misunderstood the trend of my remarks and the object I had in asking certain questions, to give him an opening to tell us the difference in cost of constructing inclines and horizontal retorts, as he has but recently had occasion to prepare figures for both systems of carbonizing plant. He said that this was the first time that any snch figures have been placed before any of our meetings. And only a little while before I had just stated that I placed—not these same figures, but similar figures—figures covering all operations with inclined retorts, compared with horizontals, before the American Gas Light Association 8 years ago. I don't want it to go on record that I sat here and said nothing by way of a protest, when such a statement as that, flatly contradicting me, was made. While I don't think Mr. Ramsdell meant it that way, yet, since he said what he did, I ask that my correction shall also be noted. But these figures were given by me, and some of you were present at the time, at the St. Louis meeting of the American Gas Light Association, in October, 1896, and will be found printed in the proccedings of that date. It will be found that my figures of that period contain not a few facts which will be useful to anyone now who may desire to compare cost and results with horizontal and inclined retort systems, and that they embraced many things not touched upon at all to-day, excepting in way of corroboration. I received them from eminent foreign and American engineers at the time, and not a few were from my own practical experience, and they were quoted by permission and authority, and were about the same as those that were given here to-day, so far as those of to-day went. So that it is not the first time that such figures were placed before any Association in this country.

Mr. Addicks—Mr. President, I may throw a little oil on the troubled waters. I thought Mr. Ramsdell said that those were the first American figures that had been placed before American engineers.

Mr. Egner—I would not have said that if he had.

Mr. Shelton—I would like to say that you are both wrong. I think Mr. Egner has misunderstood, and I think Mr. Ramsdell is in error, at least as far as one other set of figures is concerned. Mr. A. H. Barret, of Louisville, Ky., presented his figures for the first six months' operation—the same difficult period of trying out—at one of the Western meetings. They can be readily found for comparison. They are figures, moreover, of the only American built inclines, that have so far been published.

Mr. Bradley—At the risk of being considered too active, I would like to console my old friend Egner here with the wellkown saying that a prophet is without honor in his own country. I remember very well 25, nearly 30 years ago now, when at an Association meeting—I think it was the same Association—I made the same remark that I have made to-day, only on another subject, that water gas was here to stay. At that time I was talked about, and one of the members of the Association, a very old friend of mine, said to me he was sorry to see I was running after false gods. That is why I appreciate the fact that a prophet is without honor in his own country.

Mr. C. H. Gifford—I have not had the candle power on the coal gas taken at any time when the water gas was shut down long enough for me to get a fairly good estimate of the coal gas candle power. I think the highest we have taken was 15 and the lowest was 14.2, so it would be an average somewhere about 14½ candles. Our yield per pound of coal for the six months ran, 4.65, 4.73, 4.75, 5.04, 5.03, and, in December, 4.90. But during the first part of the month of December I was trying some experiments of the length of time we were burning the charge, and my make dropped off, so it was 4.90, giving an average of 4.87. For the month of January the average was 5.

Mr. Addicks—Mr. President, may I ask, in regard to this candle power, whether it is all iron oxide purification?

The President—Mr. Gifford, what kind of purification is yours?

Mr. C. H. Gifford—Iron oxide entirely.

The President—What is yours, Mr. Prichard?

Mr. Prichard—Very largely iron.

Mr. Bradley—Mine is iron entirely. That makes a difference. You get a little higher candle power with the lime purification.

Mr. Shelton—I would like to ask for a little information in connection with the crushing of the coal. Mr. Gifford said—if I remember the paper rightly—that the large coal, when too large, ran down to the lower end of the retort; if it was altogether dust it would not run at all, or words to that effect. I had supposed that the question of angle had been determined, working in conjunction with the fact that the coal would be crushed to a uniform size, and that there was no longer any difficulty as to the angle of the retort, or in getting the distribution of the coal, because of the fact that all the coal was run through a crusher and broken to any size you pleased. I was also under the impression that 2 inches was about the maximum sized lump that was permitted. If 2 inch coal runs down too fast, and ½-inch coal might work very nicely, why isn't the coal all crushed to ½ inch? Has Mr. Prichard or has Mr. Gifford found in the last few months of the running any practical difficulty in the crushing end of the business, in getting a uniform size, in spite of the fact of having provided apparently adequate crushers and fixed that thing all up? Does the variation in the size of the coal complicate it?

Mr. Prichard—The greatest trouble, Mr. President, we have, is getting coal of any appreciable size. (Laughter.) It is all so fine that we would not have to put it through the crushers, except for occasional lumps.

The President—What is the angle of the retorts?

Mr. Prichard—32°.

The President—What is it in your case, Mr. Gifford?

Mr. C. H. Gifford—32°.

Mr. Bradley—Referring to that question, I will read just one statement: "Our crushers and screens are arranged to reduce the coal to 1 inch mesh. This was unnecessary, as we found that coal which had been through a 3-inch screen is perfectly satisfactory."

Mr. Anderson—Mr. President, I was going to say the greatest trouble we have, is that in some cargoes we receive there are not any lumps; if we had somebody pick the lumps out for us we would probably crush them to the desired size. But we find that coal properly mixed—that is, take, as Mr. Bradley says, 3-inch coal, mixed with a certain amount of fine—will go in all right. As he says, in having too light a charge there is a great fault. When the coal is properly mixed we have no trouble at all; it lays just as handsome from the lower end to the top as can be; but when it is exceedingly fine the men understand that they must give it more impetus, and in that way they manage to get the fine coal down.

Mr. Prichard—Mr. Anderson has wrestled with these furnaces about as much as anyone in America. I think tt would be very interesting if he would tell how well they do work, as a matter of fact.

Mr. Anderson—The furnaces, you speak of?

Mr. Prichard—Yes.

Mr. Anderson—The furnaces, as we know them to-day, are all right. There is no tronble whatever in getting any heat we want. We can in 2 or 3 hours change the heat so that it is very noticeable. We can either get it up or get it down simply by an arrangement of the secondary air. I have tried in all ways, tried changing the primary and the secondary, and changing the fire dampers, but I found the best of all was to set my primary air, then set the dampers, and do the whole regulating with the secondary air. I get along now with setting the secondaries twice in 24 hours, where it did at first seem to be the rule to be at the fire dampers, primary and secondary, every 2 or 3 hours. We have no tronble now in mixing our gases and getting any heat that we want; just simply a little manipulation of the secondary air.

Mr. Allyn—A matter which none of the gentlemen who have been speaking to us have touched upon, and it seems to me one of the vital questions; that is, the durability of inclined retorts. It has always seemed to me that when these retorts had seen their best days it would be an extremely difficult thing to patch them up and keep them in good working order, as we do the old horizontal retorts. All the coal gas men know that we often have retorts from which, after scurfing, pieces drop out of the sides and bottom when it would seem almost impossible to pnt them into condition to make them serviceable again, but after putting in a few plugs and puttying them over with clay, in a few hours time the retort is apparently as good as ever, and we get months of service out of it afterwards. Now the question is whether you are going to be able to do this with inclined retorts. It hardly seems to me as if it would be possible.

Mr. Anderson—I will state, Mr. President, at the present time we have not any retorts approaching that condition. We have not had any experience in that line. But I can see where, after the benches are let down, from the fact that we don't need them any more till next fall, it would be a very easy matter to lower a man down through with a rope and have him patch them up as they should be, and with proper material I think they would come out as good as new, or nearly so.

A Voice—What, the men? (Laughter.)

Mr. Anderson—I think, as far as anything shows now, as we have been running ours nearly 8 months, they are good for 2½ years without any plugging.

The President—Mr. Barnum, will you tell us something about the coke conveying?

Mr. Barnum—There is not much to be said about the coke conveyor that we put in at Worcester, except as to its fundamental principle. All coke conveyors have been as a rule built to take small amounts, either small pocket or trough conveyors. This is more in the form of a crane, and takes it in large packets (24 bushels, 36 cubic feet), and by handling it in the large packets we get rid of making breeze. That is one of its chief features. The adaptability of it to various uses around the works is remarkable. The coke comes from the retort house and is dropped into this bucket. That bucket is hoisted by the carriage running on a trestle. That bucket of 24 bushels is delivered either at the boiler house, in front of the boilers, at the water gas on the operating floor, or over the coke crushers. The principal feature of it is that you handle the coke in large packages, and another feature, which is nearly as important, is its adaptability. You can deliver this coke where you are going to use it immediately after it is brought out of the retort house, and it is not stored and then handled a second time. That same conveyor not only takes the coke but it takes the ashes; being a single bucket, it takes the ashes from the retort house to the end of the trestle, takes the cinders from the water gas in the same bucket to the boiler house, takes the ashes from the water gas to the dump, and also will take coke from storage during the summer time that has been piled up during the winter. I think those are the principal features of the conveyor.

The President—Have you any figures as to the cost of moving any given weight a given distance?

Mr. Barnum—No, I have not. One man operates the car. I might state that the car is hung on wheels, and it is not on top of the track. Perhaps some of you have seen pictures of a similar railroad in Germany; it hangs on wheels from overhead, instead of the wheels being underneath. From the time of knocking the lids off the retorts until the coke is delivered on to the water gas floor is 6 minutes. Thus, 3 retorts are drawn and the coke is taken out of the retort house, quenched and delivered to any one of three places in 6 minutes.

The President—Are these retorts discharged by machinery?

Mr. Barnum—Yes.

The President—Will you describe the machinery you have for discharging and recharging?

Mr. Barnum—It is the standard Bronder drawing machine.

Mr. Norris—In order to get the facts correctly, I would like to know whether I am right in understanding that the labor figures given refer to retort house labor only, that they include all the labor of charging and drawing, getting the coal into the retort house and the coke out, and also the care of the fires, but do not include any extra or general labor around the works. Also, am I right in understanding that the candle power is bar photometer candle power, and that the gas is burned in Argand burners?

The President—Will you answer those questions now, Mr. Prichard?

Mr. Prichard—I did not take any candle powers at all, except of the mixed gas.

The President—With relation to charges on labor.

Mr. Prichard—My figures on labor were from the coal pile to the coke pile, including everything. I might go a little farther into it, and if I am wrong Mr. Anderson will correct me, because he has the figures closer in his mind. With 10 men on fires, 5 men days and 5 nights, and 2 men on days only to look after standpipes, hydraulic main, etc., the best make we had was something like 918,000 cubic feet per day.

Mr. Norris—Did these men take care of cleaning the fires and the removal of the ashes?

Mr. Prichard—Everything, from the coal pile to the coke pile, everything—cleaning the fires, taking out the coke, bringing in the coal, cleaning the standpipes, everything, except repairs and blacksmith work, such blacksmith work as sharpening tools and work of that kind, that you have around the retort house, but including everything about the ordinary operation of the retort house.

Mr. C. H. Gifford—I was going to say that 6 men did all the work in the retort house, all the carbonizing labor. They brought in the coal, took out the coke and cleaned the fires and standpipes. Of course when there was a stopped main we would get in a little extra help from the yard, but aside from that they did all the work in the retort house, and the foreman looks after the exhauster besides somewhat.

The President—And with reference to the candle power?

Mr. C. H. Gifford—The candle power was on a bar photometer, Argand burner.

The Secretary—I would like to inquire if the New Bedford outfit did not include all the steam engineering labor, care of the machines and exhausters, etc.

Mr. C. H. Gifford—Well, very largely. We have a man now who looks after the engines and does some of the oiling, and he looks after the oiling of the coke conveyor and the coal conveyor. He has a sort of general oversight of that, is a sort of a handy man. He is a blacksmith and jack-of-all-trades. The foreman in the retort house looks after the exhausters and the engines quite a little.

Mr. Prichard—Mr. President, I will answer that the general standard for the labor operation of inclines is 1 man per bench per shift. For example, if they were running 8 benches they would have 8 men on a shift. That would include all the labor from the coal pile to the coke pile.

Mr. Bradley—In view of these questions I will just read my memorandum as to labor. Two foremen, 4 men, on the charging floor; 8 men on the discharging floor; 1 man on the fires—we simply clinker once in 24 hours, not twice; 1 man to look after the hydraulic mains; 6 men handling the coke, and half a man on the coal. The coal, you understand, we bring in with conveyors, and in half a day the man brings in all the coal that is necessary. After we get our coke con-

veyor installed I propose to drop 7 men out of that lot and get along very much easier. The photometric measurement was made by the standard Bunsen bar photometer, 100 inches long, with a flat flame burner. All of our official tests in New York are with the flat flame burner. The Argand burner is not used there. The gas was purified by the use of oxide of iron. You all know what that means. With lime you would have a little higher candle power than with oxide. There is another question as to the labor in inclines versus horizontals, perhaps. I always have the faculty, when I get something that I think is just right, of thinking how I can pull it down and put up something better. While I was abroad this summer I found a charging machine on the other side that struck me as being very nice. I imported one, and have it at work now. It is what is known as the De Brouwer machine—a centrifugal machine. The connection is this, that I think perhaps it will go a long way towards solving the difference in operating, between inclined and horizontal, because it is all in the labor. It is the De Brouwer machine, and to those of us who have been used to the ponderous charging machines running up and down the house the comparison is simply ridiculous. It runs electrically, and charges a 10-foot retort in about 5 seconds. It is, in fact, so quick that before the man who starts it can get round to the other side to see what is going on, it is done. We have it in operation in New York. If any of you gentlemen are in New York and would like to see it. I would be pleased to have you look at it. It is charging horizontal retorts.

The President—Will you state how they control the distribution of the coal at the different points in the retort?

Mr. Bradley—It does not apparently require any controlling to amount to anything. The machine that we have, I will say now, was speeded for a 20-foot retort, and we shall be obliged to put in some resistance coils, a rheostat or something, to drop the speed a little, so that we can control it. I saw a 20-foot wooden retort charged in Montreuil, one of the suburbs of Paris, experimentally erected with the top off. The coal would in the first instance go to the back end of the retort and stop there, then it would simply draw right back from rear to front, by a simple impact against the body of coal already in there. Apparently they did not regulate the speed at all, but in charging a 10 foot retort I think it is necessary. That is why we are going to tone this machine down a little, and get it so that we can regulate it. I think it is worth any gentleman's while to take a look at it who feels inclined to. I simply refer to this machine as being perhaps the turning point between the inclined and the horizontal benches in the matter of economy in working.

Captain White—Chief Bradley, what station in New York is that machine at? Some gentleman has inquired.

Mr. Bradley—Foot of East 14th street.

The President—Mr. Parker, can you elucidate this question of inclines somewhat as to small installations?

Mr. Parker—I don't pretend to be up enough on the subject to really get into it at all.

The President—Mr. Carpenter?

Mr. Carpenter—The President has asked if I could not give some information about the Milwaukee plant. I know the house has been started about a week, but I have not had a chance to visit the works since, and really have no information which I think should be given out at this time. Everything is working well. The retorts are being brought up slowly; they are starting well, and in the course of time the entire house will be in operation.

The President—Can you give the cross section of the retorts, the length, the angle, and what kind of coal they are going to use; the size?

Mr. Carpenter—They are horizontal retorts, with West stoking machines, 16 by 26 inches in cross section, and say 4 feet high, in so-called vertical 8's.

The President—Mr. Prichard, can you give the power required to move the coal and the coke?

Mr. Prichard—No, I can't. In the original plans they called for 8-horse power motors on the elevator arrangement, and 15-horse power in one place. We decided, in order to have them all alike, that we would put in 15-horse power motors in each place. But we have not kept a very close record of the power as yet; I cannot tell you what it is. It is not a considerable item at all. I was going to say, Mr. President, the thought came to me as the matter was being discussed that I have read occasionally that the settings of 9's are not satisfactory, and I think some of the gentlemen abroad adopt 8's, but so far as we have gone we see no trouble whatever with the setting of 9's.

Mr. Shelton—We have heard from gentlemen here who have these liftle bits of works that make 500,000 a day, or perhaps a million a day, and particularly this inconspicuous example from New York, which makes a very trifling quantity every day! Of course, those figures do not apply to the great majority of the gentlemen who compose this assemblage, and incidental to this general discussion I want to transfer your thoughts for the moment to a really consequential works, that is just about to make experiments with inclines on a large and magnificent scale! I happen to have the anticipatory pleasure of these stopped standpipes, and creeps of a new sort, and things of that kind, for the reason that in Lynchburg, Va., I am just putting up a large and magnificent inclined retort installation, comprised of 3 benches of 6's, with retorts about 12½ feet long, instead of the 18 and 20 feet which you speak of. In other words, in the very near future there will be a demonstration (for such success as time will show is in it) of an inclined setting and stack much more approaching the caliber of a great many of the larger operators and magnates who are here! That will be started, if things are favorable, next month. The work is about completed. The drying out fires are in now. I hope by the time that next fall comes (the time that the American Association meets, for instance, in Washington this coming fall) to be able to show you a pretentious works of this caliber—3 benches of 6 inclined retorts, of about the same cross section which you have been speaking of practically, but length 12½ feet. In other words, we shall have a large unit, a tremendous unit, of about 75,000 feet per bench, not 150,000 and 200,000 feet per bench, the picayune units that you other gentlemen have been speaking of! One object that I tried to obtain in designing this large and comprehensive retort house was to avoid the insignificant buildings, only 50 and 54 feet high, that have characterized the front page of Mr. Prichard's paper, and no doubt loom up in the atmosphere in New York. I have always had contempt for high buildings if one could possibly wriggle out with a low one, and this Lynchburg installation has a maximum height of but 30 feet to the eaves; in other words, the old 3-story, triple-deckers, I have managed to cut down to a basis of only 30 feet from the ground to the eaves. and have kept within a moderate sized building the works of the caliber of which I speak, and have done that by resorting to a detached producer. Mr. Gifford has producers inside, as I understand; Mr. Prichard has his producers external, according to the photograph. I have gone one step farther, and have external producers, but 20 or 25 feet away from the benches, connected with a goose-neck pipe, so that the gas from them can be brought back to the point for firing. Of course, it will be urged that the loss of heat through this connecting pipe, and all that sort of thing, is going to send the company to the poor house in no time. I do not believe any such thing. I think those connecting pipes can be so properly and sufficiently protected and lagged as to have a very trifling loss of heat because of that feature, and that the additional advantage of complete and perfect access to the generators from every point of the compass, and liberty to use any kind of fuel which the better generator enables, will fully offset any loss of heat in that way. By virtue of having the producers external, and by having the coal pockets overhead in a little skeleton frame like a water tower above the roof (instead of taking the whole square of the building up for the sake of housing a pocket of coal in one corner), we held it down to 30 feet in height. I hope that this fall all of you who can get to the American Association meeting will be able to borrow enough money and time to go to Lynchburg and see our large and magnificent setting of 3 benches of 6's.

The President—Mr. Russell, will you give us some further information about these settings of the magnitude referred to by Mr. Shelton?

Mr. Russell—I regret that I was called out a little while ago, and I may rehash a good deal of what Mr. Shelton has told you. I expect he described very thoroughly that installation at Lynchburg. I will say that I have no data here, and my recital is from recollection. The arches are 8 feet 6 inches in the clear. The retorts are about 15 by 23 at the top, and 15 by 26 at the bottom, and are 12 feet 7 inches long. The benches are practically half-depth; that is to say, the recuperation is about the same height as the recuperation would be in the ordinary half-depth bench, plus the amount you can get in from the slant under the plan of the retorts. The arches are tied with 12-inch buckstays; that is, 12-inch I-beams or front and rear buckstays, and 15-inch end buckstays. I don't recall just the weight of the section. Two of the buckstays in the rear are lattice columns, which support the coal bin on top, which projects to the roof, as Mr. Shelton has described. The producers are built by Messrs. Webb & Company, and are steel shells. They are about 5 feet 6 in the clear. The charging apparatus is very similar to that used in other kinds of retorts. I consider in the construction of inclines that a very important feature is tying the arches so that they will not give to any extent. I think it is decidedly more necessary to have them tied securely than in

horizontal work. The front of the retorts is braced with horizontal beams from buckstay to buckstay, and there are some vertical sections to keep the retorts from pushing out. Mr. Shelton has arranged to connect these benches with a blower connected with a stack, and also to operate his boiler stack with the same fan, which I think will be very successful. I think that is about all I can say further than he has in description of these benches, and probably I have said a good deal that he said formerly.

Mr. Egner—I would like to ask Mr. Russell if he will please state (I think it would interest everybody here) the comparative cost of such benches, namely, inclines, wtth horizontals, taking the producing power as the basis. I do not mean that he should give the actual figures in dollars and cents; but the comparative difference of cost of erection complete, of inclined and horizontal retort benches of like gas producing capacity, in per cent. as he has found it.

Mr. Russell—In answer to Mr. Egner's question, Mr. President, I should say that the cost of this construction, as it stands at Lynchburg, would be about double the cost of horizontal benches of the same capacity, but the cost there is excessive owing to the fact that only 3 arches are provided for. The producers could be enlarged at slight expense to provide a very much greater amount of gas, and this cost being distributed over a la rge stack would minimize the cost in a much larger installation very materially. I saw at the old Kent Road station, in London, a stack of benches (horizontals) that were being operated by prod ucers. These producers were placed one at each end of the house. They were built of brick after a special design of one of the engineers, I think Mr. Carpenter, and they were very ingenious and worked extremely well. The gas was taken through cast iron mains, as I recollect, and passed into the benches. This gas, when it entered what co rresponded to the furnace of the ordinary bench, was introduced into a retort, which was heated from the waste gases of the bench, thereby bringing the gas to a higher degree, and probably taking up what it lost in heat in being transmitted from the producer to the bench. They had a system of goose-neck valves, sand valves, by which they could shut off any bench in a very few moments. I did not get the exact figures, but they stated that they were working very economically.

The President—Mr. Bredel, will you speak on the subject either of the inclines or of the conveyors of coal or coke for them?

Mr. Bredel—I don't think I have very much to say for or against inclines. I think it is largely a question of choice. There is a possibility of a saving in the inclines against horizontals. With the improvements made in the last two years, say, in charging machinery, it is in my mind very much of a question if really the advantage of the inclines will hold good under the various con ditions of working them.

The President—We would like your ideas in the matter.

Mr. Bredel—I don't think we have got time enough to go into this. Coal conveying is all right, but coal conveying with horizontals means a tremendous installation before it is going to pay. Germany was conveyor crazy 2 years ago. A man that spent $500 a year for labor to handle his coal could put in $20,000 conveying machinery to do it. Under special conditions almost every gas works would have to consider, first, what was the cost of installation, and then the cost of repairs. It is pretty hard for me to tell. That is what your question was; wasn't it?

The President—Yes. I think that is a very important item which we have neglected too much. This description of the Germans as being conveyor crazy is succinct and explicit, and Mr. Bredel has put it very strongly. When machinery is to be used but a very short time out of the year, it is questionable as to how much money can be invested in such a plant. I think it was one of the English engineers who said that a machine ought to operate 10 weeks out of the year in order to be sure of a remunerative return. How many weeks do you think, Mr. Bredel, should it operate?

Mr. Bredel—It depends altogether on where it is. It is pretty hard telling. I should think if a machine lies 75 per cent. of the time idle that the deterioration by rusting, etc., and the cost of keeping it in running order while not working would be pretty nearly as much as the wear and tear by running. These things ought to be taken into consideration in coal conveying. Naturally in coke conveying, where you handle your coke 24 hours out of the 24 and run the machinery, there is a very easy proposition; I mean a coke conveyor will be in service a long time when a coal conveyor would be a nuisance.

The President—Thank you, Mr. Bredel. Before asking Mr. Prichard and Mr. Gifford to close this discussion, are there any more questions that want to be answered?

Mr. Egner—I think Mr. Ramsdell did not quite catch the drift of my question. Mr. Ramsdell has contracted to build both inclined and horizontal retorts quite recently, and I understand is still ready and willing to do it. I have no doubt he can give us an answer nearly on what I would like to bring before the Association, namely, the difference in cost between inclined and horizontal retort benches, taking the producing capacity as the basis of the figures. Not, how much does one bench cost in dollars and cents, but proportionately about, if Mr. Ramsdell will be so kind as to answer that, according to his experience.

Mr. Ramsdell—I cannot answer that offhand. Of course the size of the plant would have quite considerable to do with it. But roughly speaking I should say that it would be safe to count the increased cost of an inclined installation, with proper machinery for coal handling and coke handling, as somewhere between 5 per cent. and 25 per cent., according to the size of the equipment. The larger it is the less it will be. Of course the larger sizes would have to include charging and drawing machinery in the horizontal house. The very small plants it is difficult to reduce to percentage, because the cost of building and everything of that kind is so much larger; it would be in both naturally, but still it is larger in proportion, I think, for the inclined house than it is for the other. From the experience I have had in getting up figures of one kind and another I should say that it would be perfectly safe to count on that range of increased cost.

Mr. Prichard—I have really nothing further, Mr. President. I would add that if the gentlemen would like to go to Lynn we should be very glad to see them to-morrow. The charges ordinarily come out at 3 o'clock and 5 o'clock in the afternoon, and I have arranged to have the 3 o'clock charge delayed until half-past 3, so that anyone who is there between a quarter past three and 4 o'clock can see the middle retorts discharged and see the plant. You can go from here on what we call the "Narrow Gauge," which leaves the Atlantic avenue station every 15 minutes at that time of day, and a half hour's ride for a 10-cent fare lands you within 5 minutes' walk of the works. You can see the whole installation there, and we shall be glad to show you any part of it.

Mr. Richardson—Mr. President, I move that a vote of thanks of the Association be given to Mr. Prichard, of Lynn, and Mr. Gifford, of New Bedford, for the very instructive and interesting papers that have been read upon this very important subject of inclines. [Adopted.]

(To be Continued)

[Revised by the Secretary.—Continued from Page 413.]

PROCEEDINGS, ELEVENTH ANNUAL MEETING, MICHIGAN GAS ASSOCIATION.

Held in Saginaw, Mich., Feb. 17 and 18, 1904.

First Day—Afternoon Session, Feb. 17.

The Association reconvened pursuant to adjournment. The first business was the

ROLL CALL,

to which the following responded:

Arnold, W. T.	Freese, F. W.	Peter, J. B.
Arnold, F. C.	Forbes, C.	Printz, C. H.
Auger, R. H.	Guldlin, O. N.	Persons, F. R.
Auger, H. B.	Harvey, T. A.	Robinson, B. C.
Bates, T. A.	Hester, J. G.	Rue, G. W.
Barthold, W. H.	Hellen, W.	Stirling, J. C.
Baxter, H. G.	Hubbard, G. H.	Sloan, J. C.
Blowers, F. W.	Howden, F. J.	Schaddelee, R.
Burnett, G. H.	Hellen, J.	Schacklette, R.
Chamberlain, G. R.	Hess, F.	Swope, H. C.
Calkins, J. M.	Hoffman, J.	Stebbins, E. S.
Challis, P.	Knight, J. J.	Stacey, A. J.
Church, L.	Knowlson, A. T.	Sales, M. W.
Cobb, B. C.	Loutitt, W. H.	Steinwedell, W. E.
Clark, H. F.	Lovett, E. C.	Turner, G. E.
Cameron, G. D.	Lloyd, A. G.	Trever, A. F.
Cunningham, J. R.	Lawrence, F. M.	Tippey, B. O.
Dorr, T. E.	Morgans, F. E.	Van Wie, E. G.
Douglas, H. W.	Morley, G. B.	Wolff, S. E.
Dean, S.	Morris, H. C.	Wilson, J. C.
Davis, E. P.	Mershon, C. E.	Whalen, T. J.
Ewing, A. P.	Munroe, S. L.	Ward, W. L.
Eaton, W. M.	Mason, C. T.	Walker, L. E.
Eaton, J. R.	Neuendorf, C.	Wickham, L.
Eaton, A. B.	Owens, J. H.	Weston, J. A.
Frazer, D. H.	Osius, G.	Young, P.
Findlay, J. H.	Potter, F. H.	Zwisler, A. L.
Friedrich, A. V.		

The President then appointed the following special Committees:

On Scholarship—Messrs. W. M. Eaton, Henry W. Douglas, J. T. Lynn, Fred. Persons and B. C. Robinson.

On Place of Next Meeting—Messrs. A. P. Ewing, Fred. Persons and John Hellen.

The President—Next in order is the paper entitled

A FEW NOTES ON AMMONIA,

by Mr. F. E. Sheriff, of Battle Creek, Mich. Owing to the unavoidable absence of Mr. Sheriff, I will ask Mr. W. H. Barthold to read the paper.

[For the text of Mr. Sheriff's paper, see JOURNAL, Feb. 22, 1904; p. 287.]

Discussion.

The President—It is too bad that Mr. Sheriff could not be here. He is well up on this subject and could be asked some questions that would be very interesting. Perhaps Mr. Barthold would reply to any questions asked.

Mr. Douglas—The paper refers to the percentage of fixed ammonia being reduced by the addition of warm water rather than the crude liquor in the hydraulic. Do you suppose the percentage was reduced because the volume of ammonia was increased? If the volume of ammonia would be decreased that would work the other way, would it not?

Mr. Barthold—Yes, sir.

Mr. Douglas—How do you account for that, Mr. Barthold?

Mr. Barthold—In one case where the crude ammonia liquor was used the liquor from the overflow tested 44 per cent., and in another case, where warm water was run into the hydraulic, the percentage was decreased. In one case they used a large amount of warm water; but he didn't speak of that. I think they must have used just a small height. He said the total ammonia was practically the same in both cases. I don't know hardly how they could become more fixed.

Mr. Douglas—I thought possibly it was simply a question of percentage; a different quantity and consequently a different percentage.

Mr. Barthold—I have noticed at different works, using the same coal, and as far as I can see handling the case in the same manner, the amount of fixed varies from 10 to nearly 20. Grand Rapids has 10 per cent., Jackson 18 per cent. I tested several last fall at 20. Saginaw runs about 17 per cent. and Pontiac will run about 16 per cent. I say they handle their cases in about the same way, except I don't know how much is condensed in the hydraulic. In Grand Rapids we get 10 per cent. of ammoniacal liquor per ton of coal, whereas others get 3 per cent. Another question connected with it is as to the amount of lime per ton of coal. At some works they use about twice as much lime as others in their concentrator; and I never knew just how much difference it made in the fixed by having the wells exposed to the open air. There is too much ammonia lost directly without any such oxidizing going on. I think Mr. Whalen, at Jackson, passes a small stream of water through his hydraulic main. I don't know whether he is keeping that up. That may tend to bring his fixed up higher. The hydraulic main liquor usually contains about 65 per cent. of fixed ammonia; but if you put any water in there you will bring it down. That is, water absorbs a lot of ammonia in the warm state, and adds pretty highly to your percentage of fixed.

Mr. Eaton—Mr. Sheriff refers to the rotary scrubber delivering a 6 per cent. liquor. Does any gentleman present know the probable size of the scrubber referred to, how near its capacity was being used, and whether it did take all of the liquor from the fresh water scrubber, or was there any fresh water scrubber used. In other words, what is necessary to produce 6 per cent. liquor?

The President—I don't know what rotary scrubber Mr. Sheriff refers to. What do you have in Battle Creek, Mr. Challis?

Mr. Challis—Two tower scrubbers.

The President—You haven't a rotary scrubber?

Mr. Challis—No, sir.

Mr. Eaton—If liquor can be concentrated in any particular apparatus to 6 per cent., your concentrator capacity is very materially increased, and the steam cost for handling your liquor reduced. I know of no such results being obtained.

Mr. Douglas—We have a rotary scrubber, but have never got as high results as that. We got up to 4 per cent. with it.

Mr. Eaton—How much of the capacity of your apparatus have you used?

Mr. Douglas—A little less thrn one-half the capacity.

Mr. Baldwin—I believe the result of 6 per cent. ran from the scrubber. It ran up high. The reason was we used a small stream of hot water to get a certain percentage or amount of ammonia out of it. Then we lost some ammonia in the hot water. We started that scheme to recover as much ammonia as practicable from it.

Mr. Eaton—Do you know the yield in pounds per ton?

Mr. Baldwin—At that time they were getting about 4.70.

Mr. Eaton—Was this percentage of liquor used long enough?

Mr. Baldwin—No; that was used to know how it could be done.

Mr. Eaton—Then you don't know how many pounds per ton you could get by concentrating to 6 per cent.?

Mr. Baldwin—No, sir.

The President introduced Mr. H. C. Morris, of Bay City, Mich., who read his paper on

THE LAYING OF HIGH AND LOW PRESSURE (RIVER) GAS LINES.

[For the text of the Morris paper see JOURNAL, Feb. 29, 1904, p. 325.]

Discussion.

Mr. Baldwin—Was wrought iron or steel pipe used in this case?

The President—It was National Tube Company's line, steel pipe.

Mr. Eaton—In your first attempt, suppose you tapped it at 3 or 4 places, letting the water in moderately, couldn't you have sunk it without any trouble, or danger of breaking it?

Mr. Morris—As soon as you had tapped it, after your pipe had once been submerged, it would be hard to control it, and make it settle evenly; it would not have gone slowly.

Mr. Hellen—You would have to hold it after you got it there.

Mr. Douglas—Mr. Morris, do you figure the 12-inch line and the high pressure line as having the same capacity.

Mr. Morris—We consider a 12-inch line of ample capacity, because this main we had on the west side is 10 inches; as for the 4-inch high pressure line it has a capacity of 28,000 an hour, which is ample capacity to take care of that part of the city.

Mr. Douglas—What is the capacity of the 12-inch line?

Mr. Morris—The capacity of the 12 inch line as I figure would be about 30,000.

Mr. Barthold—The capacity of the 12-inch would be about 25,000, but this 4-inch will carry a great deal more if you have greater pressure. It will carry 20,000 at much less pressure per 1,000 feet. If you put on pressure enough it will carry much more than the 12-inch line. I think a 3-inch will carry fully as much as a 12-inch line.

Mr. Douglas—On a 20-pound pressure you can carry 4,000 an hour through an inch pipe.

Mr. Barthold—Yes.

Mr. Douglas—Suppose you put on a pressure and double the capacity—you carry 20 pounds initial pressure on your 4-inch main, will it double the capacity of your 4-inch line?

Mr. Barthold—Suppose your 4-inch line would carry 50,000 at 20 pounds, if you run up your initial pressure you get more.

Mr. Dean—What initial pressure would be added necessary to make a 2-inch pipe equal to a 6-inch pipe in capacity?

Mr. Barthold—I think it would take about 9 times the capacity; if I am right.

Mr. Dean—That is, you mean to say if a 6-inch pipe were run under a 3-inch pressure, it would take 9 times the amount of pressure on a 2-inch pipe.

Mr. Barthold—Well, I wouldn't say that. I could tell very readily by figuring it.

Mr. Douglas—I should ltke to ask Mr. Morris also if they considered the question of a duplex compressor, and if so why they decided on a single action compressor?

Mr. Morris—I will let Mr. Barthold answer that.

Mr. Barthold—You mean a single cylinder compressor?

Mr. Douglas—Yes.

Mr. Barthold—Well, we looked up the different compressors, and that one as far as we could tell had given very good satisfaction; if we had decided to get one of the duplex type, of course it would cut down the size of it considerably, or the size of the cylinders.

Mr. Douglas—A duplex compressor costs about 40 per cent. more for the same capacity; but it has an advantage in that it can be run at any speed. If the consumption is light on your line you can make 2 revolutions per minute on the duplex compressor. If you have a single acting compressor and your volume is for 30 revolutions, you have to make just 30 revolutions. With the duplex you can stop and start again as required. It seems to me the saving in this way was enough to more than make up the difference in cost.

The President—The reason we installed the single compressor is that we did not calculate to use the high pressure line. We figured when we put the line in it would be a dead line; and our only reason for putting it in was that if anything should happen to the low pressure line, such as we could not remedy by the use of a marine diver, we

would have the high pressure line to fall back on. We have never used the high pressure line at any time for over 10 to 14 hours, and that simply as a trial test. If we were to get a duplex compressor we would be out that much more money.

Mr. Barthold—I thought he spoke of two distinct compressors. You speak simply of a duplex compressor; a single machine.

Mr. Davis—I notice this work was discontinued during the winter season. Could not considerable expense have been saved if the work had been done during the winter, if the river had sufficient ice?

Mr. Morris—Why, considerable dredging had to be done in order to properly lay it again; and the expense of moving the dredge about in the ice and doing dredging work through it would be a great deal more expensive than doing it in seasonable weather. We were going to attempt to finish the job, but at that season the ice would hinder it.

Mr. Dean—Would it be possible to put a cylinder on the other side in order to compress your gas sufficiently to make a day's supply, so you would always be supplied. Run your compressor during the night, say; give it sufficient pressure so you would not have to run the compressor continuously?

The President—I suppose it would, Mr. Dean; but that is something we didn't figure on.

Mr. Dean—Wouldn't that have reduced the expense, if you had a receiver there that would hold, say, sufficient gas to run you 12 to 15 hours in case of a breakdown?

The President—Yes, that would be perfectly feasible, I think. On the same principle as a holder.

Mr. Dean—Yes; the other side.

The President—There was no object in our doing that, because we had our 12-inch line. This high pressure line was only to be used in an emergency.

Mr. Douglas—I think instead of a receiver you could duplicate your apparatus much cheaper. Suppose they had a requirement of storage of 100,000 feet and you compressed it to 2 atmospheres, you would only reduce your receiver to ½ volume, or 50,000. A holder that would at 2 atmospheres contain that amount would be quite expensive. A compressor with a capacity of 13,000 feet an hour only costs about $600.

Mr. Barthold—This compressor has a capacity of 26,000 feet per hour.

Mr. Knight—I would like to inquire if you have a holder on the opposite side of the river?

The President—No, sir.

Mr. Knight—How will you operate your high pressure line without a holder?

The President—By the governor at the station.

Mr. Knight—What does it cost to compress gas per 1,000 feet, about 20 pounds?

Mr. Barthold—I have heard it costs all the way from ½ cent to 2 cents. Of course, that depends on the pressure. I have seen it estimated that at 30 pounds it would be ½ cent per 1,000; but I think that is pretty low. I think it would be from 1 to 2 cents.

Mr. Douglas—I have heen looking up this subject quite thoroughly and I have been unable to find a definite statement as to the cost of compression. People who build compressors guarantee that when they are run at a capacity of 13,000 feet an hour the cost will not exceed 12½-horse power per hour. Of course, it depends entirely on what your steam costs.

Mr. Douglas—I might say in this connection we have a question in the question box which would apply. I have some answers to it. I wrote to Mr. Shelton and Mr. Goodnow. The question is:

"Is high pressure feasible?"

Mr. Goodnow's letter is as follows:

WAUKEGAN, ILLS., Dec. 15, 1903.

MR. H. W. DOUGLAS, Sec. Michigan Gas Association: Dear Sir—In response to the question you have submitted regarding delivery of gas to consumers' meters under high pressure, I would say we have been supplying gas by this method for the past 3 years and now have about 600 meters connected to the high pressure system with individual regulators just before the meters. We never had an accident nor a burst meter. The meter and piping are protected by an oil safety seal set between the meter and the regulator, and piped to the outside air and set to blow at 6 or 7 inches. It is a very rare occurrence, however, that these seals blow. We have also about 400 meters working after 2 district regulators, with the mains, services and meters constructed in the same way as the ordinary low pressure system. Both the individual and district regulators are set to give from 25-tenths to 30-tenths pressure. We also have about 100 mantle street lamps working directly off the high pressure pipes. It is a rare occurrence when we have a frozen service on this system, either in the lamp posts or in house services. The highest pressure we use is 35 pounds, but it occasionally drops to 15 pounds without disturbing the pressure on the low side of the regulators.

It would give me much pleasure to accept your invitation to be present at the coming meeting, hut for fear it may be impossible to do so, I write you this letter instead in reply to your question.

Very truly yours, GEORGE F. GOODNOW.

Mr. Shelton's letter is as follows:

PHILADELPHIA, PA., Feb. 4, 1904.

Mr. H. W. DOUGLAS, Secy., Michigan Gas Association: Dear Sir—You asked me recently to answer the following question for your next meeting.

"Is the delivery of gas to consumer's meter under high pressure entirely safe and practical; what is the best method of safeguarding it, and the limit of pressure in pounds?"

I answer that the delivery of gas is entirely safe and practical, the best proof being that natural gas companies have done this for years, and one of my companies, with illuminating gas, is serving about 2,500 customers at pressures ranging from 10 to 30 pounds, with a private regulator at each house. The service could be safely controlled with pressures of twice this amount if necessary, but it is not desirable to go into any higher range than is needed to deliver the gas, because of effect on the candle power. The best method of safeguarding is to use a standard regulator, which will work dependably in connection with such safety vent, as will, however, absolutely avoid any possible danger, even if the regulator once in 500 times did not work.

Yours truly, F. H. SHELTON.

Mr. Sloan—When they speak of an independent machine I suppose they refer to 2 smaller separate machines. If you had 2 separate machines the arrangement would be more simple.

Mr. Burnett—In Lansing they run at about 3,000 feet. They run it clear to the outskirts of the city to reinforce the supply to the outside residents. We take it across the bridge.

Mr. Sloan—What sized line?

Mr. Burnett—Three-inch.

Mr. Sloan—What pressure do you carry?

Mr. Burnett—Fifteen pounds.

Mr. Sloan—You have no controllers or governors?

Mr. Burnett—We run it right out to reinforce a low pressure line, and it gives good satisfaction.

Mr. Knight—What do these individual governors cost on services?

The President—The cost runs from with a 5-light, if I remember correctly, at $2.25. They are carried up to 10, 20, 30 or 45-light governors and the difference in cost between the different sizes is small. I think it runs up to about $4.50 to $5 for a 30-light. I will get those figures over in the office if you would like to see them.

Mr. Knight—All right; I would.

Mr. Dean—Are those connected outdoors or go right in the cellar?

Mr. Douglas—They are all outdoors.

Mr. Sloan—I know it is a great loss, however, to have such things and have to watch them.

Mr. Dean—Well, the difference between pipe setting with 2-inch down to ¾-inch pipe is not much, but with 4-inch and 3-inch it would require quite a number of regulators, permit me to say.

The President—That is true. Mr. Burnett, where did you say your line was laid, at Lansing?

Mr. Burnett—Lansing.

Mr. Douglas—I would like to ask Mr. Burnett to give his construction of regulator station.

Mr. Burnett—We put it right at the end of the low pressure line in the street at a regular manhole with a manhole cover. We have a tap that runs away at the outside of the regulator, so that when the regulator fails to work it will blow about 5½ inches, and runs to the surface of the ground, so there would be no excess of pressure on the low pressure line.

Mr. Douglas—You have a by-pass to this regulator; a complete station with by-pass.

Mr. Burnett—Yes; a by-pass on the old line; and the new line runs right into the old line. We pump right into it and the regulator keeps right at that point. It works very nicely.

Mr. Douglas—You have had no trouble with it at all?

Mr. Burnett—No trouble whatever. I don't see why it requires any extra mechanic to run a compressor. If you have a man around there who can take care of the exhauster he can take care of the compressor without any extra expense, as well as the rest of his work.

Mr. Knight—Mr. Burnett, did you put in a single acting or duplex compressor?

Mr. Burnett—No, sir; we got a Westinghouse which ran at about 4,000 feet an hour.

Mr. Knight—Have you got the cost of the service?

Mr. Burnett—No; we haven't got through figuring on it yet. I will say it takes quite a little steam. Mr. Cook said he figured it at ¼ cent., but we haven't got done and we figure pretty hard.

Mr. Knight—Did you dig any services for the high pressure line?

Mr. Burnett—No, sir.

A Member—Do you run that regularly all day?

Mr. Burnett—No, sir; we put it on just as we need it, a few hours during the day; don't keep it on all the time. Speaking of regulators at houses, I should think that the illuminating companies are now about in the position that the natural gas companies were when they started to distribute gas. At the time they started they did business that way, piping high pressure through the streets and setting individual regulators at the houses; but now you couldn't get a natural gas company to put a consumer on its high pressure line. They know that every one they set will cost them more in trouble of watching it and wasting of gas than they can get out of it. If anyone is contemplating a high pressure system they had better put a low pressure in for distribution or they will be sorry for it before they get through. Whenever they do it they will have a waste of gas.

The President—We have never used them on natural gas in Detroit, except at the request of consumers.

Upon motion, a vote of thanks was extended to Mr. Sheriff and to Mr. Morris for their valuable contributions.

The President introduced Mr. T. J. Whalen, of Jackson, Mich, who read a paper on the

CARE OF BENCHES AND RESULTS THEREFROM.

[For the text of Mr. Whalen's paper, see JOURNAL, Feb. 22, 1904; p. 284.]

Discussion.

The President—I think you will agree with me, gentlemen, this is one of the best papers ever written on the subject of benches from the author's standpoint. I think we should get much benefit from it. Mr. Whalen is ready to answer questions.

Mr. Douglas—One question is as to how he fires the coke and how he measures the coke to be fired.

Mr. Whalen—The coke is brought in just the same as the coke that goes on the yard. That coke is unloaded, brought back to the retort house and dumped on the floor, and the regular coal man loads this coke back into the same wagon that is used to fire his benches.

Mr. Douglas—You weigh your coke?

Mr. Whalen—Yes, sir.

Mr. Douglas—Do you consider it accurate?

Mr. Whalen—Yes. It is accurate in a way. The average results would be better if we were to allow for the water we put on. There is probably an increase of about 10, 15 or 20 per cent.; at least 10 per cent. more fuel is used.

Mr. Douglas—What is the object of emptying it on the floor and then loading it into the wagon?

Mr. Whalen—Our benches are so constructed that it is not easy to do better. I never like to see coke cool off on the floor.

Mr. Douglas—You bring the coke right through to the floor in your coke wagons; why not bring it up on the elevator right from the coke wagons?

Mr. Whalen—You cannot charge into the firebox from the coke wagons. It doesn't cost any more to charge from the regular wagons, and it wouldn't cost any less to charge from the other wagons.

Mr. Douglas—Have you ever atttempted to get your coke from the retort into the furnace direct?

Mr. Whalen—I have in other plants, but not in Jackson. While I am speaking of it, hot coke is more economical than cold coke. I am better satisfied with the way we do it, for if you put it on the floor I don't think you get as good results.

Mr. Ewing—I would like to ask Mr. Whalen how big are the wagons on which he quenches the coke?

Mr. Whalen—We don't quench with a spray. The spray is an ordinary garden one applied on the outside while the coke man is throwing down the hot coke. It is only to protect the wagon while he is upstairs.

Mr. Ewing—How big a wagon is it, Mr. Whalen?

Mr. Whalen—About 24 inches, I believe.

The President—Why don't you use pails?

Mr. Whalen—When we used pails we had a great deal of trouble putting the fire out evenly, as one part of the coke is too wet while another part is too dry. Some throw on 9 or 10 pails of water and others will take more or less. While we do not allow them to use pails, we have better screened coke.

Mr. Dean—Would the pail increase the amount of smoke and ashes and steam flying around the works?

The President—You put water on and get just so much smoke and steam anyway, I should think.

Mr. Douglas—I would like to ask your opinion as to the comparative area of the secondary air flue and air ports in your furnace.

Mr. Whalen—The areas of those ports, if I remember right, are something like 3½ inches and 2½ inches. There are 7 of those on each side of the firebox and 14 in the furnace. The secondary air port below is something like 8 by 5.

Mr. Douglas—Then you have an area, in round numbers, in your air ports, of about 84 square inches and your flue 48?

Mr. Whalen—Yes, sir.

Mr. Douglas—Don't you believe that the air of the secondary flue must reach some of those ports before it does others. Why doesn't a greater portion of the secondary air get through the ports it reaches first?

Mr. Whalen—It comes in from the bottom and goes to the fuel. There is the secondary air port coming through where the air is heated, and when it goes in the firebox it goes through the inner chamber, and when it gets up through the chamber there it has to be distributed.

Mr. Douglas—We have had considerable trouble in maintaining a uniform heat in the back of the bench—combustion seemed to be greater in the back part than in front; and we found, by reducing the area, putting in some pieces of brick and plugging the air ports at the back, we were able to maintain a much more uniform heat and distribute the air better.

Mr. Barthold—I think your trouble was, Mr. Douglas, you had too much draft. To obtain the best results you should have a slight draft. If you have a low pressure your air is going to come up more evenly.

Mr. Whalen—You will find also, Mr. Douglas, by examining closely, that some of your sighting boxes have slipped down, leaving all the hot gases to come to the back end. I have also partly stopped up the furnace flues in the back end of the furnace to make them smaller than the front one. I haven't done that in Jackson, but I have in other works.

Mr. Douglas—Mr. Barthold, when you open the upper sight hole and you get a slight outward draft you consider that you get a pressure instead of a draft?

Mr. Barthold—Yes.

Mr. Douglas—Well, that condition existed at the time.

Mr. Barthold—There should be pressure at the time you fire up, but if you take your top sight plug out of the arch, if you are burning coal, it will push it there quite a little while after you fire.

The President—Mr. Whalen, what is your cost per 1,000 for stokers in the retort house, or cost per 1,000 feet of gas made for labor?

Mr. Whalen—It runs from 6½ to 7 cents.

Mr. Wolff—You mean for stoking labor only?

Mr. Whalen—6½ cents I think. The way we keep our accounts doesn't include taking care of the house or any extra labor.

The President—That is what I meant, just the stokers.

Mr. Dean—I am running a water gas plant and I would like to inquire, when you see a blaze coming out of the top of the chimney 30 to 60 inches, whether the drafts are what they should be in the retort.

The President—I don't quite catch that.

Mr. Dean—Many times in passing by gas works you will see a blaze coming out of the chimney over the benches anywhere from 15 inches to 3 feet. Now certainly it is easy to see the heat is going out to warm the universe. The question is, couldn't it be kept down to heat the retorts. In a water gas plant if you should be blowing that way you would be throwing your money away.

The President—You shouldn't see much of that coming out of your furnace.

Mr. Dean—Well, that is what I would like to find out, as I am not now in the coal gas business.

Mr. Eaton—The flame can't show out of the chimney if the bench is all right unless you have the secondary shut off entirely, and then it wouldn't be apt to go up there.

A Member—I think, with the exception of 2 or 3 minutes when the blaze would run down through all the flues, you will see the blaze stopping at the end of the first flue in the recuperator. Am I right Mr. Whalen?

Mr. Dean—When this blaze keeps going up continuously it shows the furnace has not sufficient air for the amount of coal or coke it is burning.

Mr. Eaton—Or it would be a short circuited bench, in the first place, if you had that condition.

Mr. Knight—I would like to know as much as is proper for me to know about what results are obtained under this plan of operation of benches at Jackson as to the yield of gas, the kind of gas, the life of the bench, its yield, etc.

Mr. Wolff—I will give Mr. Knight such information as I can from memory. I think our yield per bench last year was 62,500 feet, and I think the yield per pound of coal was about 4.98. As to the life of the bench, we have one 35 months old, and the one alongside is 34 months. The others run from 14 to 29 months.

Mr. Knight—How many benches are there?

Mr. Wolff—Five. Mr. Eaton has figured out that a bench that is 34 months old will run 10,000,000 feet of gas per mouthpiece. I would like to ask Mr. Whalen to describe his retorts and how he decarbonizes them?

Mr. Whalen—We use a steam blower. We take an ordinary 3-inch cross, it is 3 by 3 by 3, and reduce it to 2 inches. We have a piece of pipe about 2 feet or 3 feet long to slip into this. The steam pipe is connected with the other end, and it is then reduced ½ inch, then another inch pipe extends along beyond the arms of the cross, and it is reduced to a very small opening, say not over ¼ inch. We use then a piece of ordinary 4-inch wrought iron pipe, slip the 2-inch into that, using it as an extension piece. We can decarbonize the back end of the retort or can slip it forward or anywhere we want it. Then we turn on the steam through ½-inch opening. It draws air in from the outside of this 3-inch cross and the air and steam go together and loosen the carbon.

The President—How often do you do that, Mr. Whalen?

Mr. Whalen—When I find the retort has got as much carbon in it as would replace 2 shovels of coal I take it out because, if allowed to remain in there a week or 10 days, it will accumulate enough to amount to nearly half a charge. I don't know how often but I presume we decarbonize our retorts about every 6 weeks.

Mr. Wolff—I think we decarbonized last year about 10 retorts a month on the average.

The President—I don't suppose you ever burned out a standpipe with wood fire?

Mr. Whalen—Yes; we do, sometimes.

Mr. Douglas—I will describe the apparatus we use in Ann Arbor to decarbonize the retorts. We tried the apparatus described by Mr. Whalen, but now instead of putting steam and air into a retort we put a steam jet up in the standpipe, about 4 feet from the top of the standpipe, turn on the steam and it sucks the air of the exhaust pipe in through the retort. We find that we can burn it out much more quickly I think than where we use steam and air. We run a 4-inch pipe into the retort with a temporary mouthpiece and plaster it up tight, so that the air has to go in through this 4-inch pipe. But instead of being blown in there it is sucked in by the standpipe.

Mr. Whalen—What effect does it have on the standpipe?

Mr. Douglas—I haven't noticed any bad effect. It gets a little red possibly; that is, it burns it out very fast at first.

Mr. Whalen—How old are the retorts?

Mr. Douglas—Some of them are about 2 months and some are over 4 months old. I tried it in 4 old retorts, and it opened up cracks less than by putting in steam at the bottom.

On motion a vote of thanks was extended to Mr. Whalen for his excellent paper.

An adjournment to Thursday morning was then ordered.

(To be Continued.)

Address of Mr. John D. McIlhenny, President of the Ohio Gas Light Association, on the Occasion of Its Twentieth Annual Meeting, Cleveland, O., March 16, 17 and 18, 1904.

To the Members of the Ohio Gas Light Association: It is my agreeable duty to chronicle a year of advancement for the Ohio Gas Light Association. Imbued with a spirit of helpfulness, this Association is contributing largely to the welfare of the gas industry and of those connected with it. While primarily a State organization, its vigor and practical character have attracted to it many from outside the State of its birth. To all a warm welcome is extended.

In the work of Associations, committees constitute an effective means of accomplishing results, the requisites on the part of the members being ability and willingness to serve. With the greatest pleasure I commend the committees of the Association for the energy and zeal displayed by them, and for the satisfactory results produced.

The Editors of the different departments have unselfishly devoted their time and talent to the Association and the dissemination of knowledge. Much honor is due them.

The Ohio Association can truly be proud of its achievements. The utmost usefulness, however, of Gas Associations, has not yet been found. More should be done for the members throughout the year. Problems arise, often of minor character, but difficult of solution, particularly in isolated locations, and help at the time would be most valuable. I suggest, therefore, as a step toward greater usefulness, that a Bureau of Information be created which may be called upon by the members at any time. The Editor of the Bureau could have assistants in each department of the profession, to whom inquiries could be referred.

The Association this year publishes its first volume of proceedings, covering the 3 years just past. The issuance of a new volume each year is contemplated, in order gradually to embrace all the proceedings. The task of indexing and preparing the book was undertaken by Mr. T. C. Jones, Secretary of the Association, as a labor of love, and he is entitled to our gratitude.

While the Association has been so prosperous during the year it has nevertheless felt the hand of the grim reaper in four deaths among our members. The names of three honorary members can no longer grace our rolls:

Eugene Vanderpool, Newark, N. J.; died July 12th, 1903.

Wm. A. Stedman, Brooklyn, N. Y.; died Sunday, November 8th, 1903.

Asa S. Bushnell, Springfield, O.; died January 15th, 1904.

From our active members we have lost:

Burgess L. McElroy, Mount Vernon, O.; died Sunday, June 28th, 1903.

As is customary, a special committee of the Association will prepare minutes for record in our official proceedings.

I can report to you a satisfactory condition in general of the gas business. It is being developed thoughtfully and intelligently. In manufacture the value of small economies is especially appreciated. High pressure confers valuable assistance in difficult problems of distribution, and its application will steadily increase.

Uses for gas unfold constantly and outputs steadily advance, though in no case has the maximum possibility been attained. The goal of 10,000 cubic feet per capita per annum in the United States has already been passed. The campaign for increase along well-known fuel lines continues, and more attention is being given to the lighting field, which for a time was partially overlooked. Economical burners and attractive lamps are at our disposal, and we must remember that each additional outlet gained adds to the value of our plant.

The sale of gas for industrial purposes offers alluring opportunities and is a most desirable field now opening for gas companies. It has a particular advantage, since the gas is used continuously as a rule many hours of the day and throughout the year. This class of consumption, from its evenness of load, is most profitable, and gas companies can afford to offer extraordinary inducements for its cultivation. Appliances can now be obtained for nearly all purposes of which heat is an element, permitting the employment of gas in many ways heretofore thought impracticable.

The surroundings of some of us may be less fortunate than others, but they who consider their environment discouraging should take heart. There is always a best possible result in every situation. Eagerness for credit often handicaps our efforts. Benjamin Franklin, the practical man of affairs and sage philosopher, in his autobiography states that he always preferred to remain in the background, and eventually he was found to be the real power, obtaining credit for even more than he deserved.

We are engaged in no mean occupation, and can well be proud of our calling. It demands qualities worthy of men—fidelity, diligence and ability, with capacity to control events and direct movements. Gas was first made and sold for light 100 years ago. To-day it makes day of night and dark places light, it has relieved womankind of drudgery, and is a servitor of good not equaled by any other commodity in the civilized world.

LIGHT and Water Inspector Tupper has filed an estimate of the sum which will be necessary to carry on the public lighting of San Francisco for the coming year. In round figures he puts the expenditure involved at $295,000.

[Prepared for the Journal by Mr. Frederic Egner.]

Some Patent Office Statistics.

The U. S. Patent Office is one of the "sights" of the National Capital. It is open to the public between the hours of 10 in the morning until 2 in the afternoon, every weekday, holidays excepted. Located in the building occupying the block bounded by F and G and 7th and 9th streets, N.W., it can be easily found by strangers visiting the city of Washington.

"The Commissioner of Patents" is the official title of the head of this important bureau of the Department ef the Interior of the Government; and all communications intended in any way for notice or action by the Patent Office or any official thereof should be addressed and directed to that officer. No other designation is required, and the prefix of "Hon." is out of order, though it might be justly applied to the present incumbent of the office, Mr. F. I. Allen. There are 772 employees in the Patent Office, and a more courteous, hard-working, earnest lot of men and women cannot be found in any other establishment in or out of the government service. The office hours are from 9 in the morning until 4:30 in the afternoon, with a half hour allowed for luncheon. In point of necessary requirements and actual intelligence, the employees of the U. S. Patent Office may be confidently described as without superiors in any other professional line or walk of life. Experts in every branch of human industry are found there, whose attainments and knowledge in their respective branches simply border on perfection, and usually are marvelously accurate. Numerous examples in illustration might be given, but let one suffice: Thomson Jay Hudson, Ph.D. LL.D., deceased, May, 1903, was one of the assistants in the Patent Office, and "between times" as it were devoted his leisure hours to thoroughly and effectively upsetting the whole of the atheistic theories of Darwin, Huxley, Haekel and others; and, employing only strictly scientific facts, using confessedly the very arguments found in Haekel's "The Evolution of Man," Darwin's "Origin of Species," and other noted writers' works on the same lines, demonstrated beyond any possible reasonable doubt, the "Divine Descent of Man," in his work of that name, which should be studied, and could be so to great advantage to Christianity of every shade, in every theological institution in this world. His book, "The Law of Psychic Phenomena," while knocking the bottom out of all superstitious cults, points a way for investigation which, if followed by competent seekers after truth, cannot but help to prove of vast benefit to all mankind. Several other works mark Mr. Hudson as having been a scientist of the first order, and had he written nothing but his "The Divine Descent of Man," in which as stated he disproves totally the whole of the atheistic arguments of every kind and description ever advanced, thereby presenting a sure anchor of hope to all who are doubting or agnostic, he would be deserving the thanks of Christian mankind in particular and all the rest in general. He passed away comparatively unknown after a useful life, part of which was as one of the modest, unostentatious attaches of the U. S. Patent Office.

The Patent Office is probably the only self-sustaining branch of the government service, and the volume of business done can be surmised from a few extracts taken from the last annual report of Mr. Allen to Congress, dated January the 28th, 1904.

Under the general head of "Receipts and Expenditures" we find that the receipts from all sources were $1,642,201.81, and the total expenditures for the year 1903 were $1,448,645.81, leaving a surplus of $193,556, which was turned over to the U. S. Treasury, where the balance in favor of the U. S. Patent Office now amounts to $5,682,540.61, and this in face of the fact that the selling price of the publications of that office have been greatly reduced from former prices. For example; copies of the drawings and specifications of patents which a few years ago could be had for 25 cents each, can now be obtained by sending 5 cents (not in postage stamps) to the Commissioner of Patents, accompanied by name of inventor, number and date of the patent of which a copy is desired. The *Official Gazette* of the United States Patent Office is published weekly, and contains, among other information of value to inventors and patent attorneys, one or two illustrations of every patent issued during the week, and the accompanying "Claims" of such in full, from which selections of such patents as one may desire can be intelligently made.

When we now remark that during the year 1903, 31,699 patents and re-issues were granted, which will average over 600 per week, the contents of the *Official Gazette*, its value to those interested, and the immense amount of work done by the Patent Office can be surmised.

We find that while in 1837 only 435 patents were issued, this had increased to 12,864 in 1873; 22,383 in 1883; 23,769 in 1893 and the number stated above, 10 years later. It is also interesting to note that, in a table giving the number of patents issued in ratio to the population, Connecticut heads the list with one to every 996, thus maintaining the proverbial supremacy of the Yankee and especially that of "The Nutmeg State." Rhode Island has one to every 1,224, and Massuchusetts one in 1,348; while Mississippi leads "The other end of the line," for one patent to every 22,161 of population is recorded there. Even Alaska did better than that. However, when we remember the great preponderance of the colored element in the far South, and that it is more of an agricultural than a manufacturing population, this great discrepancy in inventive genius between the two sections will not appear so remarkable, for Virginia, also handicapped by the colored brother to a pretty heavy extent, shows one patent to every 8,829 of population. Among the patents issued are 117 re-issues. Trademarks, labels and prints registered, figure up 3,446. Patents expired during the year were 21,797, and among these were some of the essential ones of the "Otto Silent Gas Engine," which in turn was manifested by no less than 217 patents for gas or oil engines mostly, and a few improvements to such, being issued during that year. The number of patents issued during the past year was the largest annual issue in the entire history of the Patent Office. The number of patents issued by all countries, from the earliest records, is given as 1,536,982; this does not include the United States, but the other 58 independent countries or provinces. In the United States alone 758,523 patents were issued, or very nearly one-half as many as in all the world besides.

Let us conclude this article by quoting from Commissioner Allen's report: "The stimulus given to the industrial arts by the hope of reward which the patent system presents to the inventor is conceded by the thinking men of most civilized countries to-day, and the rapid progress of Japan has been accompanied with the adoption of a patent system in which they were largely influenced by impressions derived from an examination of the patent system of the United States." The Commissioner also calls the attention of Congress to the fact that the Imperial German Patent Office "Annual issue of patents is now about 6,000, and that they employ something like 2,000 persons in the work, against our 31,699 patents, with 772 employees." It cannot be doubted but that life in the German Patent Office is hardly as "strenuous" as in that of the United States. Perhaps that is a good reason why many an able, thoroughly efficient attache of the U. S. Patent Office secretly trembles, when he finds the "silver threads" showing among his hair (if he has any left), for here as elsewhere the heartless, unchristian, cruel and unjust, though very modern agitation against men of mature years has shown its medusa-like head, but as yet without result. In the Patent Office at least, experience seems to count for something, while no amount of political "Pull" would be worth one copper, to influence a decision to be rendered for or against an applicant for a patent, if he otherwise complied with the regulations set forth in the "Rules of Practice in the United States Patent Office" and which can be had freely for the asking by anybody.

Outside of the U. S. Patent Office, there are nearly 5,000 registered attorneys engaged in the procurement of patents for applicants, scattered all over this country. But let no one suppose that one attorney could procure a patent by reason of any influence which he might even boast to posses—he would have to do the said boasting much "on the quiet" though, else disbarment proceedings might follow closely; but the advantage of employing a competent attorney consists mainly in having one's own ideas put into the best possible shape, so that the Official Examiners can understand what the inventor himself not infrequently knows, but is quite unable to make clear; and also to bring out in the best, most comprehensive form the points which the inventor desires to have protected by letters patent. While anyone, by following the "Rules of Practice" mentioned before, could act as his own patent attorney, it is advisable to always employ a registered attorney. It will pay well for anyone contemplating the taking out a patent to heed this advice. This may be more apparent to the reader upon being informed that the business of the Patent Office is divided up among 38 divisions, and that one of these, viz., Class 48, "Gas, Heating and Illuminating," is itself divided into a number of sub-classes embracing 224 "definitions" of subjects; and then, when all is said, this whole Class does not include all of the inventions which bear upon the industry of gas making, or are of practical interest to the gas man. Some interesting inventions for the gas man may appear in any one of the following: Sub-class 202, "Charcoal and Coke;" or, "75, Metallurgy;" or, in a general way, in "Division XXXI.; or" Sub-class 23, "Ammonia;" or Division VI.," "Chemicals;" and "there are others." One pleasing feature of the annual report of Commissioner Allen is the statement that, out of the 38 divisions in the Patent Office, 23 were taking up the

consideration of applications now, within 1 month of the filing of the same; and that the rest of them were in arrears only from 1 to 2 months, all of which assures applicants of a probably speedy relief on account of and from happy anticipations of the fortunes seen—and sometimes remaining there—in the clouds by most of them.

A Union Engineering Building in New York.

New York city, already adorned with some fine buildings devoted to the arts and sciences, is now to enjoy the possession of a great central home for engineering, due, very appropriately, to the initiative and generosity of Mr. Andrew Carnegie, and carrying out ideas with which the public has become more or less familiar during the past year. The following letter gives the facts briefly:

ANDREW CARNEGIE, 2 East 91st St., New York.
March 14th, 1904.

Gentlemen of the Mechanical Engineers; Institute of Mining Engineers; Institute of Electrical Engineers; Engineers' Club of New York:

It will give me great pleasure to devote, say, one and a half million of dollars for the erection of a suitable Union Home for you all in New York city. With best wishes, truly yours,

(Signed) ANDREW CARNEGIE.

It may be stated that the three national engineering societies named and the Engineers' Club, which, by reason of its widespread membership is also increasingly national in character, have, with the unanimous approval of all the memberships, already taken active steps to put into being the splendid trust for engineering thus created by a man whose own career has illustrated the upgrowth of the engineering and industrial arts in America. The total amount involved is not less than $2,500,000, for, in addition to the amount given by Mr. Carnegie, a sum of over $500,000, represents the investment in land for the three societies on West Thirty-ninth street, between Fifth and Sixth avenues; while the Engineers' Club has also acquired valuable land for its own purpose on West Fortieth street, immediately facing the New York Public Library. The Union Engineering Building will probably be 12 stories in height, and will be laid out expressly with an eye to the services required of it. In many respects it will be unique. The three national engineering societies made trustees by Mr. Carnegie will have large headquarters there; and already several kindred bodies have made urgent requests for accommodation. There will be four or five auditoriums of different size, notably one to seat 1,200 to 1,500 persons; and all will be appropriately equipped for scientific meetings, lectures and demonstrations. Above all, there will be an engineering museum and a noble library hall, where all the libraries concerned will be grouped and consolidated, yet each section administered by its respective Society librarian and each adding to its own specific literature, so as to avoid duplication of outlay for books or periodicals. It is proposed, moreover, to co-operate intimately with the New York Public Library, nearby, along these lines of work, so that nowhere else in the world can the student or practitioner find thus freely available the whole literature of engineering and technical industry. The three libraries assembled in this manner will even at the outset include some 50,000 volumes, many of them great rarities of inestimable price.

The three societies, each of course maintaining its identity and autonomy, will themselves need considerable room in the new building, which it is hoped to have ready in 1906. They have a total membership to-day of over 9,000, and are growing at a rate of between 10 and 15 per cent. annually. They administer a total income of $135,000 annually and in assets of all kinds have property to the value of between $250,000 and $300,000, a sum to which the gifts of individual members are now adding rapidly. The sister technical societies asking for quarters and facilities represent also another great body of over 5,000 members, engaged in all branches of civil, mechanical, electrical, municipal engineering, etc. Large, therefore, as the Union Engineering Building, with its frontage of 125 feet on five lots, may seem, it bids fair from the start to find every inch put to fructifying use. The Engineers' Club Building, a separate entity, will immediately flank the Union Building, the two sharing the same resources of light, heat and power, and being most advantageously situated for intercommunication and mutual social benefit. The club, with a long waiting list, has just increased its membership to 1,200, and administers a budget of about $120,000 a year. The buildings, facing thus on two streets, are to harmonize as to architecture, as they do virtually in function, as homes of engineering, and their central position commanding all lines of travel at the very heart of the city, insures the acme of convenience to visitors from outside the city or from abroad, as well as to all local members.

The three societies provide the land, but in the meantime Mr. Carnegie has promptly acquired it for them. The leases run out about July 1 and work will then begin forthwith and be pushed ceaselessly to completion, as the building is in reality sorely needed by the bodies that are to occupy it, and that now chiefly occupy rented quarters ill suited to their purposes. The Engineers' Club has also already made purchases of land for itself on West Fortieth street, not far from the new Republican Club opened recently. Plans for the architectural part of the undertaking have already been drafted, and the architects will soon be selected. The representatives of the four bodies interested as the direct beneficiaries and trustees of Mr. Carnegie's splendid gift to engineering are as follows:

American Society of Mechanical Engineers—Prof. F. R. Hutton, C. Wallace Hunt, J. M. Dodge. American Institute of Mining Engineers—Dr. A. R. Ledoux, Theodore Dwight, C. Kirchhoff. American Institute of Electrical Engineers—C. F. Scott, Dr. S. S. Wheeler, Bion J. Arnold. The Engineers' Club—J. C. Kafer, W. H. Fletcher, T. C. Martin. These as a conference committee have carried the matter patiently through its earlier stages and are now vigorously engaged in working out all the details of an enterprise which, recognizing frankly the close interdependence of all branches of engineering, endows them jointly with means for professional and educational work never before enjoyed in any country by such organizations, or on such broad conditions of public welfare; leaving, nevertheless, to the societies their distinctive and individual conditions of existence.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

AT the annnal meeting of the shareholders in the Towanda (Pa.) Gas Company the following Board of Managers was elected—the meeting was notable for the fact that every share of the capital stock was voted: N. N. Betts, R. A. Mercier, Fisher Welles, F. T. Page, O. L. Haverly and C. P. Welles. Mr. Haverly succeeds Mr. S. W. Little, who disposed of his interest in the Company some time ago.

A CORRESPONDENT in this city, writing under date of the 12th inst., forwards the following statement of improvements that are underway on the plant of the Queens Borough (L. I.) Gas and Electric Company, and which are being speedily moved towards completion: At the Rockaway Beach works, a 500,000 cubic feet capacity storage holder, by the Stacey Mfg. Company; a new water gas apparatus, duplicating the existing apparatus, and giving a capacity of 1,000,000 cubic feet per day; a suitable dock and pier for receiving coal and other supplies by water; gas main extensions from Far Rockaway, through Lawrence, Cedarhurst, etc., to Woodmere. A large plant has been under construction at its gas works during the past year, from which a full supply of gas was expected to have been made under the Lowe coke and gas process, but not yet having reached such advanced stage of completion and demonstration as to insure the same, the new water gas apparatus became a necessity to meet the demands of the coming season. The Company has planned electric line extensions from the present line at Woodmere to East Rockaway, Lyndhurst and Valley Stream. The cost of new holder, water gas apparatus, dock and extensions of lines will exceed $150,000.

THE Northwestern Gas and Electric Light Company, which recently secured control of the lighting plants at Walla Walla, Wash., has, through Dr. F. W. Vincent, applied for a franchise under which it proposes to operate a gas plant in Pendleton, Ore.

COLUMBUS, O., seems anxious for the appointment of an official gas inspector, a resolution for the naming of such an official being now before the City Council.

THE proprietors of the Savannah (Ga.) Gas Company have announced a reduction in the selling rate of 15 cents per 1,000 cubic feet, the concession to date from the 1st inst.

A CORRESPONDENT in Nashville, Tenn., writing under date of the 10th inst., forwards the following: "The shareholders of the Nashville Gas Company held their annual meeting yesterday. The old Board of Directors was re-elected to serve for the ensuing year, and the reports of the officers concerning the year's business were listened to with in-

terest. President Thomas H. Malone's report showed an increase of 16,000,000 cubic feet in the business of the past year, despite the fact that the use of electric lights by the city for street lighting had cut off 10,000,000 cubic feet formerly supplied by the Company. During the year, the Company's mains were extended 7 miles, with service pipes to new patrons totaling 10 miles."

THE Elgin (Ills.) American Gas Company has reduced its selling rate to $1.05 per 1,000 cubic feet. The new schedule became operative March 1st.

THE real purchaser of the New Castle (Del.) Gas Company was Mr. E. Mitchell, Jr., President of the Wilmington (Del.) Coal Gas Company.

MR. W. H. SNOW, Manager of the Holyoke (Mass.) municipal gas works vouches for the authenticity of this new style of consumer's complaint, which was mailed to him by a prominent resident of Holyoke—Oh! that "there were more of him:"

"MR. W. H. SNOW, Manager Gas and Electric Department, Holyoke, Mass.: Dear Sir.: I am in receipt of my gas bill for the last quarter and I must say that I am very much disturbed over it. I don't understand how I could have used so little gas. I have had all I wanted for lighting, some for cooking, and we have had considerable illness, with nurses, etc. Of course, I have put in during this quarter 3 Welsbach lights, and my house was never better lighted than it has been during the last 3 months. In these times, when the standing of a man is fixed by the quantity of gas that he consumes, you will readily appreciate that I feel grieved at the standing I must have in a quarter like this."

AS a result of the disastrous conflagration in Baltimore, Md., the Consolidated Gas Company lost about 1,900 meters of all sizes. The damage to its main system is much less than that estimated in the initial loss computation. Some great service restoration work has been done in Baltimore since the trying times of the flame destroying visitor.

THE shareholders of the Worcester (Mass.) Gas Light Company will assemble in special meeting the morning of next Wednesday to consider a proposition for a notable increase in its stock. The money which it is proposed to raise by the means indicated will be expended in plant betterments.

AT the annual meeting of the Beaumont (Tex.) Gas Company, the officers chosen were: President, C. W. Tyrrell; Vice-President, H. W. Potter; Secretary, John L. Keith; Treasurer, H. H. Norvell. It was decided to build a new plant.

MESSRS J. A. CRAINE and Oscar Schneider are anxious to secure a franchise for the construction and operation of a gas plant at Marion, Ills.

THE South Shore Gas Company has succeeded to the rights and properties of the Hammond (Ind.) Illuminating Company. It is proposed to thoroughly pipe the streets of the outlying districts of East Chicago and Indiana Harbor.

MR. BIRD S. COLER, recently a candidate on the Democratic ticket for Governor of New York, is an ardent advocate of the theories supported by those who aver that every public utility should be operated on municipal account. Meanwhile it might be pertinent to remark that Mr. Coler's best business knowledge is connected with the loaning of money, the conversion of coins, etc.

A CORRESPONDENT in Chicago, writing under date of the 12th inst., says: "Mr. J. W. Murdock, Manager of the Joliet (Ills.) Gas Light Company, has been authorized to announce that on and after May 1st the selling rate will be put at $1,20 per 1,000 cubic feet, less 5 cents per 1,000 for prompt payment.

ONCE again we are informed that the rights and properties of the Vincennes (Ind.) Citizens Gas Company and of the Vincennes Light and Power Company have been purchased by the Dean syndicate, of Grand Rapids, Mich.

MR. ROTH, representing one of the Baltimore districts in the lower branch of the Maryland Legislature, has introduced a bill directing that the gas rate in Baltimore shall not exceed 75 cents per 1,000 cubic feet. There is no chance that the measure will become a law.

THE gas franchise issued by the authorities of Lead, So. Dak., has been purchased by Mr. Peter English, of Boulder, Col.

MR. W. A. GOODMAN, a Director in the Cincinnati Gas and Electric Company, died, at his home in Cincinnati, the afternoon of the 6th inst. He was very prominent in the banking trade of Cincinnati.

THE Vineyard Haven (Mass.) Gas and Electric Light Company has been organized by Messrs. Gilbert L. Smith, H. L. Felton, Foster H. Jenkins and others.

AT the annual meeting of the Rome (N. Y.) Gas, Electric Light and Power Company the Directors chosen were: James T. Lynn, M. B. Daly, John D. McMahon, Thomas H. Stryker, F. M. Shelley, Edward Comstock, E. Faeger, William R. Huntington and F. K. Pelton.

THE Standard Electric Company and the United Gas and Electric Company, of San Jose, have been purchased by the California Gas and Electric Corporation.

Iron Age in reviewing the bituminous coal situation says that an impression prevails in certain quarters that there will be no stoppages at the mines pending a decision as to the wages basis from April 1. Already there are strong indications that the substantial element in the membership in all sections, even in Illinois, the stronghold of the opposition to any reduction, will line up behind President Mitchell by voting for the 5.55 per cent. reduction in wages and the 2-year contract offered by the operators. There is always an element eager for a fight and for a test of strength or endurance, but it is believed that few large labor strikes are inaugurated that have not the support of the conspicuous leaders of the labor organizations involved. When, therefore, the principal officers and leaders of the United Mine Workers cover the entire ground with an unanswerable argument against a strike, setting forth all that would be risked in such a contest, we become at once convinced that all danger of a strike is passing. It is interesting to note the changed tone of these same labor leaders, for in their address it is stated: "We are now upon the eve of a Presidential election, and these years are proverbially dull, because of the commercial disturbances which they produce." This is a radical change of policy from that pursued in 1900, when the exigencies of a political campaign appeared to persuade the miners' leaders that no better time could be selected for wrestling concessions from the employers. The president of the third largest producing concern in soft coal in this country tells the story of the outlook: "Whether there is a strike or not, I look for a good demand for soft coal from now on, because the supply is not heavy, and only about sufficient for present needs. This is due to the slow, very slow, transportation. All the railroads are in the same condition because of the bad weather. It has been the worst winter on them for a long time. With ice, snow, zero weather and floods, they have been very much hampered in the movement of traffic. Now with the ground frozen to a depth of 3 feet under the tracks a thaw will produce what railroad men technically call a 'bad rail,' and, of course, there will be wrecks that no one in the world can foresee or prevent. Wrecks block tracks and delay traffic." And while on the subject it may be stated that the Pennsylvania Railroad did not move a ton east from the mines for three days last week. So far as the Pittsburg district, the Central fields and Ohio are concerned, it is the opinion that there will be no strike. Fears are entertained, however, by several officials of the contending parties lest the Illinois and Indiana miners roll up a majority in favor of rejecting the ultimatum submitted by the operators. President Patrick Dolan, of District No. 5 (Pittsburg), says that in order to counteract the vote of the Illinois and Indiana miners the executive board will issue circulars to all the lodges urging the members to cast their votes in favor of accepting the new scale. He said: "We will do all in our power to avert a suspension of work. Considering industrial conditions, I think the schedule presented to us is fair and reasonable. I do not expect anything but an overwhelming majority in favor of adopting the proposition." Probably the president of the miners' organization would not consider it germane to the subject to remind him that the industrial reaction to which he refers has been largely due to the work of himself and other leaders prominent in arrogant labor union agitation. Central Pennsylvania producers are advancing prices each day. The price of soft coal advanced from $2.80 last week to $3.30 for Clearfield coal, at tidewater. The cars unloaded here are not sent back to the mines, because of the congested condition of traffic, and many cars have been dispatched to the anthracite region. This is done to get as much as possible of that coal here, and the price of hard coal will not be reduced until conditions in the soft coal region are changed. Is is stated that the contract prices for the Clearfield coal will be $1.35 at the mines, for the contract season, if the new basis of wages is fixed. This, by the way, gives the men 60 per cent. more than they were receiving in 1897.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance. Single copies, 10 Cents.

The JOURNAL is the official organ of the
NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.
AMERICAN GAS LIGHT ASSOCIATION.
WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.

NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, MARCH 21, 1904.

The Market for Gas Securities.

The prevailing feature in the market for city gas shares last week was comparatively light trading with a decided advance in values. Consolidated closed to-day (Friday) at 193½ to 194. Professional dealers say that there is quite a large short interest outstanding in Consolidated, that has been rather skillfully concealed. In fact, some of them go so far as to say that one or two large operators who had been permanent holders of the shares sold the same for cash, and then backed their further belief for a decline by going short. The stories seem exceedingly fanciful. However, we have no hesitation in saying that Consolidated is a purchase.

Brooklyn Union was sparingly dealt in, some 260 shares having been reported as changing hands. Nominal prices in it are quoted at 185 to 190. The feature of the week was a sharp rise in Baltimore Consolidated, which sold as high as 67, and then sagged back to 65. The closing was 63 to 65. There is quite a bit of bolstering going on in Laclede (St. Louis) preferred, but it is bolstering pure and simple.

Peoples, of Chicago, is a trifle steadier, and at the quoted price it certainly looks a purchase.

Washington (D. C.) again manifests symptoms of another spectacular rise.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

MARCH 21.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	193¾	194
Central Union, Bonds, 5's	3,000,000	1,000	104	106
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan	658,000	..	108	112
Mutual	3,500,000	100	280	290
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	105¾	106
Northern Union, Bonds, 5's.	1,250,000	1,000	102¾	105½
New York and East River.. Bonds 1st 5's	3,500,000	1,000	109¾	111
" 1st Con. 5's	1,500,000	..	106	108
Standard	5,000,000	100	125	135
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	116	117
Yonkers	299,650	500	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	185	190
" " Bonds (5's)	15 000,000	1,000	113	115
Bay State	50,000,000	50	3/16	¼
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works....	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust....	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	3¾	4
" " Bonds, 5's	5,250,000	1,000	65	69
Capital, Sacramento..	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas and Electric Co.	29,500,000	100	97¾	98
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101½
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89½
Preferred	3,026,500	100	107½	109
Consumers, Jersey City Bonds	600,000	1,000	100	102
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore...	11,000,000	100	63	65
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's....	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	86	90
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	50
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	361,000	1,000	75	75¼
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	39	40
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	255
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	55	65
" Bonds, 6's	2,650,000	..	103½	106½
Jacksonville Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102¼
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	79	90
Preferred	2,500,000	100	..	100
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	136	140
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co.	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	64	70
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	96⅝	96⅞
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage....	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	.
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87¼	90
San Francisco, Cal.	15,800,000	100	..	55
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	92	96½
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's..	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	46	48
Bonds	2,047,000	1,000	94	96
Washington, D. C	2,600,000	20	278½	280
First mortgage 6's	600,000	..	..	..
Western, Milwaukee	4,000,000	..	..	..
Wilmington, Del.	600,000	50	230	..

Advertisers' Index.

GAS ENGINEERS. Page

A. E. Boardman, New York City ... 472
Baxter & Young, Detroit, Mich ... 472
B. E. Chollar, St. Louis, Mo ... 458
David Leavitt Hough, New York City ... 472
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 464
Frank D. Moses, Trenton, N. J ... 458
Fred. Bredel Co., Milwaukee, Wis ... 460
Frederic Egner, Washington, D. C ... 458
Geo. G. Ramsdell, New York City ... 458
Geo. R. Rowland, New York City ... 462
Humphreys & Glasgow, New York City ... 473
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 472
The Gas Machinery Co., Cleveland, O ... 460
The Jeffrey Manufacturing Co., Columbus, O ... 470
The Western Gas Construction Co., Fort Wayne, Ind... 480
United Gas Improvement Co., Philadelphia, Pa ... 467
Wm. Henry White, New York City ... 475

GAS WORKS APPARATUS AND CONSTRUCTION.

A. E. Boardman, New York City ... 472
Bartlett, Hayward & Co., Baltimore, Md ... 473
Baxter & Young, Detroit, Mich ... 472
Connelly Iron Sponge and Governor Co., New York City 463
Continental Iron Works, Brooklyn, N. Y ... 474
Cruse-Kemper Co., Philadelphia, Pa ... 459
Davis and Farnum Mfg. Co., Waltham, Mass ... 472
Deily & Fowler, Philadelphia, Pa ... 476
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 464
Frank D. Moses, Trenton, N. J ... 458
Fred. Bredel Co., Milwaukee, Wis ... 460
G. Shepard Page's Sons, New York City ... 472
Humphreys & Glasgow, New York City ... 473
Isbell-Porter Company, New York City ... 474
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 472
Lloyd Construction Co., Detroit, Mich ... 462
Logan Iron Works, Brooklyn, N. Y ... 476
Quintard Iron Works, New York City ... 473
R. D. Wood & Co., Philadelphia, Pa ... 474
Riter-Conley Mfg. Co., Pittsburg, Pa ... 475
Stacey Mfg. Co., Cincinnati, O ... 475
The Connersville Blower Company, Connersville, Ind... 477
The Gas Machinery Co., Cleveland, O ... 460
The Jeffrey Manufacturing Co., Columbus, O ... 470
The Western Gas Construction Co., Fort Wayne, Ind.... 480
United Gas Improvement Co., Philadelphia, Pa ... 467

PROCESSES.

Bartlett, Hayward & Co., Baltimore, Md ... 473
B. E. Chollar, St. Louis, Mo ... 458
Economical Gas Apparatus Construct'n Co, Toronto, Ont. 464
Fred. Bredel Co, Milwaukee, Wis ... 460
Humphreys & Glasgow, New York City ... 473
The Gas Machinery Co., Cleveland, O ... 460
The Western Gas Construction Co., Fort Wayne, Ind.... 480
United Gas Improvement Co., Philadelphia, Pa ... 467

SCRUBBERS AND CONDENSERS.

Continental Iron Works, Brooklyn, N.Y ... 474
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 464
Fred. Bredel Co., Milwaukee, Wis ... 460
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 472
Logan Iron Works, Brooklyn, N. Y ... 476
R. D. Wood & Co., Philadelphia, Pa ... 474
Riter-Conley Mfg. Co., Pittsburg, Pa ... 475
Stacey Mfg. Co., Cincinnati, O ... 475
The Gas Machinery Co., Cleveland, O ... 460
The Western Gas Construction Co., Fort Wayne, Ind.... 480

PRODUCER POWER PLANTS.

Economical Gas Apparatus Construct'n Co., Toronto, Ont. 464
R. D. Wood & Co., Philadelphia, Pa ... 474

TAR AND CARBONIC ACID EXTRACTOR.

Economical Gas Apparatus Construct'n Co.,Toronto,Ont. 464
Fred. Bredel Co., Milwaukee, Wis. 460
Stacey Mfg. Co., Cincinnati, O. 475
The Gas Machinery Co., Cleveland, O. 460
The Western Gas Construction Co., Fort Wayne, Ind. 480

AMMONIA CONCENTRATORS.

Fred. Bredel Co., Milwaukee, Wis. 460
Michigan Ammonia Works, Detroit, Mich. 460
The Gas Machinery Co., Cleveland, O. 460
The Western Gas Construction Co., Fort Wayne, Ind. 480

GAS METERS.

American Meter Co., New York and Philadelphia. 479
Detroit Meter Company, Detroit, Mich. 479
D. McDonald & Co., Albany, N.Y. 477
Helme & McIlhenny, Philadelphia, Pa. 479
John J. Griffin & Co., Philadelphia, Pa. 440
Keystone Meter Co., Royersford, Pa. 478
Maryland Meter and Mfg. Co., Baltimore, Md. 478
Metric Metal Co., Erie, Pa. 479
Nathaniel Tufts Meter Co., Boston, Mass. 478

PREPAYMENT METERS.

American Meter Co., New York and Philadelphia. 479
D. McDonald & Co., Albany, N.Y. 477
Helme & McIlhenny, Philadelphia, Pa. 479
John J. Griffin & Co., Philadelphia, Pa. 440
Keystone Meter Co., Royersford, Pa. 478
Nathaniel Tufts Meter Co., Boston, Mass. 478

PREPAYMENT METER ATTACHMENTS.

Reeves Mfg. Co., New Haven, Conn. 460

GAS AND WATER PIPES.

Davis & Farnum Mfg. Co., Waltham, Mass. 472
Donaldson Iron Co., Emaus, Pa. 464
Economical Gas Apparatus Construct'n Co.,Toronto,Ont. 464
M. J. Drummond & Co., New York City. 464
R. D. Wood & Co., Philadelphia, Pa. 474
Warren Foundry and Machine Co., New York City. 464

GAS COALS.

Berwind-White Coal Mining Co., New York and Phila. 470
Perkins & Co., New York City. 470
Westmoreland Coal Co., Philadelphia, Pa. 471

SPECIALTIES FOR OIL AND PIPE LINES.

S. R. Dresser, Bradford, Pa. 461

GAS MAIN STOPPERS.

Safety Gas Main Stopper Co., N.Y. City. 464

MAIN AND SERVICE LAYING.

Sullivan Bros., Flushing, N. Y. 460

GAS TAPPING MACHINES.

George Light, Dayton, O. 464
H. Mueller Manufacturing Company, Decatur, Ills. 461

CANNEL COALS.

Perkins & Co., New York City. 470

STOKING MACHINERY.

G. A. Bronder, New York City. 469

CONVEYORS.

Adam Weber Sons, New York City. 468
C. W. Hunt Company, New York City. 461
Economical Gas Apparatus Construct'n Co.,Toronto,Ont. 464
Fred. Bredel Co., Milwaukee, Wis. 460
G. A. Bronder, New York City. 469
Kerr Murray Mfg. Co., Fort Wayne, Ind. 472
The Brown Hoisting Machinery Co., Cleveland, O. 457
The Gas Machinery Co., Cleveland, O. 460
The Jeffrey Manufacturing Co., Columbus, O. 470
The Link-Belt Engineering Co., Philadelphia, Pa. 457
The Link-Belt Machinery Co., Chicago, Ills. 464
The Western Gas Construction Co., Fort Wayne, Ind. 480

CHARGING BARROWS & COAL WAGONS.

Kerr Murray Mfg. Co., Fort Wayne, Ind. 472
Stacey Mfg. Co., Cincinnati, O. 475

GAS ENRICHERS.

Standard Oil Co., New York City. 471
Sun Company, Pittsburg, Pa. 471
The Sun Oil Co., Pittsburg, Pa. 471

COKE CRUSHERS.

C. M. Keller, Columbus, Ind. 471
Fred. Bredel Co., Milwaukee, Wis. 460
The Jeffrey Manufacturing Co., Columbus, O. 470

STEAM BLOWER FOR BURNING BREEZE.

The Connersville Blower Company, Connersville, Ind. 477

ECONOMIZERS.

Green Fuel Economizer Co., Matteawan, N.Y. 462

GAS GAUGES.

The Bristol Co., Waterbury, Conn. 462

GAS GOVERNORS.

Connelly Iron Sponge and Governor Co., New York City 463
Fred. Bredel Co , Milwaukee, Wis. 460
Isbell-Porter Co., Newark, N. J. 474
R. D. Wood & Co., Philadelphia, Pa. 474

CEMENTS.

C. L. Gerould, Bloomington, Ind. 468

RETORTS AND FIREBRICKS.

Adam Weber Sons, New York City. 468
Baltimore Retort and Firebrick Co., Baltimore, Md. 468
Brooklyn Firebrick Works, Brooklyn, N. Y. 468
Henry Maurer & Son, New York City. 468
James Gardner, Jr., Co., Pittsburg, Pa. 468
J. H. Gautier & Co., Jersey City, N. J. 468
Laclede Firebrick Mfg. Co., St. Louis, Mo. 468
Missouri Firebrick Co., St. Louis, Mo. 468
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 458
The Kreischer Brick Mfg. Co., New York City. 468

INCLINED RETORTS.

Adam Weber Sons (Graham, Morton [England] System) 468
Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 463
Fred. Bredel Co., Milwaukee, Wis. 460
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 458

VERTICAL S'S.

Adam Weber Sons (Oscar B. Weber's Construction). 468
Connelly Iron Sponge & Gov. Co. (Drake's [Eng.] System) 463
Fred. Bredel Co., Milwaukee, Wis. 460
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 458

REGENERATIVE FURNACES.

Adam Weber Sons, New York City. 468
Bartlett, Hayward & Co., Baltimore, Md. 473
Fred. Bredel Co., Milwaukee, Wis. 460
J. H. Gautier & Co., Jersey City, N. J. 468
Laclede Firebrick Mfg. Co., St. Louis, Mo. 468
Missouri Firebrick Co., St. Louis, Mo. 468
Parker-Russell Mining and Mfg. Co., St. Louis, Mo. 458

SELF-SEALING MOUTHPIECE DOORS.

Continental Iron Works, Brooklyn, N.Y. 474
Fred. Bredel Co., Milwaukee, Wis. 470
Isbell-Porter Co., Newark, N. J. 474
Kerr Murray Mfg. Co., Fort Wayne, Ind. 472
Logan Iron Works, Brooklyn, N.Y. 476
R. D. Wood & Co., Philadelphia, Pa. 474
Stacey Mfg. Co., Cincinnati, O. 475
The Gas Machinery Co., Cleveland, O. 460
The Western Gas Construction Co., Fort Wayne, Ind. 480

CHIMNEY CONSTRUCTION.

Adam Weber Sons, New York City. 468

INCANDESCENT GAS LAMPS.

D. M. Steward Mfg. Co., Chattanooga, Tenn. 420
General Gas Light Co., Kalamazoo, Mich. 459
Welsbach Company, Gloucester, N. J. 466

BURNERS.

D. M. Steward Mfg. Co., Chattanooga, Tenn. 420
Wm. M. Crane Co., New York City. 461

LAVA GAS TIPS.

D. M. Steward Mfg. Co., Chattanooga, Tenn. 420

STREET LAMPS.

Thos. T. W. Miner, New York City. 461
Welsbach Street Lighting Co., New York and Phila. 466

PURIFIERS.

Connelly Iron Sponge and Governor Co., New York City. 463
Fred. Bredel Co., Milwaukee, Wis. 460
Kerr Murray Mfg. Co., Fort Wayne, Ind. 472
R. D. Wood & Co., Philadelphia, Pa. 474
Stacey Mfg. Co., Cincinnati, O. 475
The Western Gas Construction Co., Fort Wayne, Ind. 480

PURIFYING MATERIALS.

Connelly Iron Sponge and Governor Co., New York City 468

(*Continued on page 457.*)

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., March 9, 1904.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable April 15th, 1904, to stockholders of record at the close of business, March 31, 1904. Checks will be mailed.

1502-4 LEWIS LILLIE, Treasurer.

Situation Wanted.

EXPERIENCED MANAGER.

Thoroughly familiar with every department of the business. Coal or water gas. Successful in economical operation and development of new business. Can guarantee results. Young man. Excellent references.

1500-tf Address, "DIVIDENDS," care this Journal.

OPEN APRIL 1ST

For Position as Assistant Superintendent or Foreman.

A young married man, 35 years of age. Fifteen years' practical experience, all branches, both coal and water gas. Manufacture, distribution—high or low pressure. Regenerative benches. References.

1502-2 Address, "ASST. SUPT.," care this Journal.

Position Wanted

As Superintendent or Manager of Coal Gas Works,

By a man who in his present position doubled the output of the plant in something over a year. Knows how to sell gas ranges and other gas appliances. Can give the best of references. Address, "F.,"

1501-4 Care this Journal.

Position Wanted.

FOREMAN,

Competent to take entire charge of distribution department. Seven years in charge of main and service work. Four years in meter and stove departments. Age 38.

1501-4 Address, "A. J.," care this Journal.

Wanted, Position

AS MANAGER

Of gas, or gas and electric light plant, by a man who can show first-class results in former positions. South or Southwest preferred.

1494-tf Address, "T. W.," care this Journal.

Position Wanted

As Superintendent of a Water or Coal Gas Plant

(The latter preferred) sending out from 16,000,000 to 50,000,000 cubic feet a year. A young married man, who knows how to manage and increase business. South, or New England, preferred. Address, "ENERGETIC,"

1502-3 Care this Journal.

Wanted, Position

AS SUPERINTENDENT,

By a first class gas engineer and superintendent. Understands the manufacture of coal and water gas; also, the laying of high and low pressure mains, in detail. Is a first-class hustler for new business. Can furnish required reference. Address, "UP-TO-DATE,"

1501-4 Care this Journal.

METER REPAIRER WANTED.

A Foreman, who has had Practical Experience,

To superintend the repairing of over 2,000 meters per month. Address, stating age, experience, references, and salary wanted, "METER REPAIRER,"

1501-2 Care this Journal.

WANTED,

Within next 30 to 60 days, about 100 standard weight lamp posts. State lowest price. Address, "MANUFACTURE,"

1498-tf Care this Journal.

FOR SALE.

Complete 10-inch set of coal gas apparatus.
Condensers, washer, tar extractor,
Purifiers, valves and dry center-seal.

Perfect condition; can be examined here.

NORTH ADAMS GAS LIGHT CO.,

1498-tf NORTH ADAMS, MASS.

(*Continued from page* 456.)

VALVES.

Continental Iron Works, Brooklyn, N. Y..... 474
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 464
Isbell-Porter Co., Newark, N. J..... 474
Kerr Murray Mfg. Co., Fort Wayne, Ind 472
Ludlow Valve Manufacturing Co., Troy, N.Y..... 461
R. D. Wood & Co., Philadelphia, Pa..... 474
Stacey Mfg. Co., Cincinnati, O..... 475
The P. H. & F. M. Roots Co., Connersville, Ind..... 423
The Western Gas Construction Co., Fort Wayne, Ind.... 480

EXHAUSTERS.

Connelly Iron Sponge and Governor Co., New York City 463
Isbell Porter Company, Newark, N. J..... 474
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 472
The Connersville Blower Company, Connersville, Ind... 473
The P. H. & F. M. Roots Co., Connersville, Ind..... 423

ELECTRICAL APPARATUS.

Wm. Henry White, New York City..... 475

PURIFIER SCREENS.

John Cabot, Hoboken, N. J..... 460

GAS STOVES.

American Meter Co., New York and Philadelphia..... 465
American Stove Co., Cleveland, O 457
Detroit Stove Works, Detroit and Chicago..... 478
Keystone Meter Co., Royersford, Pa..... 478
Maryland Meter and Manufacturing Co., Baltimore, Md. 478
Nathaniel Tufts Meter Co., Boston, Mass..... 478

HOT WATER HEATERS.

Abendroth Brothers, New York City..... 459
Humphrey Co., Kalamazoo, Mich..... 464

GASHOLDER TANKS.

J. P. Whittier, Brooklyn, N.Y..... 463

GASHOLDERS.

Bartlett, Hayward & Co., Baltimore, Md..... 473
Continental Iron Works, Brooklyn, N.Y..... 474
Cruse-Kemper Co., Philadelphia, Pa..... 459
Davis & Farnum Mfg. Co., Waltham, Mass..... 472
Deily & Fowler, Philadelphia, Pa..... 476
Economical Gas Apparatus Construct'n Co., Toronto, Ont. 464
Kerr Murray Mfg. Co., Fort Wayne, Ind..... 472
Logan Iron Works, Brooklyn, N Y..... 476
R. D. Wood & Co., Philadelphia, Pa..... 474
Riter-Conley Mfg. Co., Pittsburg, Pa..... 475
Stacey Mfg. Co., Cincinnati, O..... 475

STORAGE TANKS.

Stacey Mfg. Co., Cincinnati, O..... 475

PAINTS.

National Paint Works, New York City..... 472

PATENTS, TRADE-MARKS, COPYRIGHTS.

Royal E. Burnham, Washington, D. C..... 460

BOOKS, ETC.

Scientific Books..... 469
Self-Instruction for Students in Gas Manufacture..... 461
Finances of Gas and Electricity Mfg. Enterprises 461
Hughes' "Gas Works"..... 470
Electric Gas Lighting..... 470
Coal Tar and Ammonia..... 470
Gas Analyst's Manual 476
Field's Analysis, 1902..... 417
Gas Flow Computers..... 471
Excerpts from Reports of Gas Commissioners..... 469
Directory of Gas Companies..... 475
Gas Engineer's Laboratory Handbook..... 474
Gas Engineer's Pocket-Book..... 468
Poole on Fuels..... 471
Binders..... 471

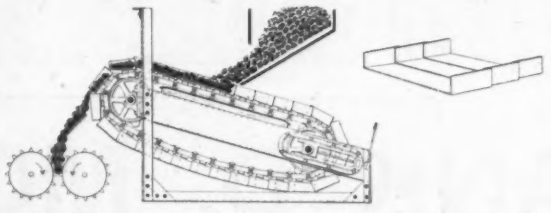
BROWNHOIST CRANES
FOR LIFTING PURIFIER COVERS IN GAS HOUSES.

WRITE FOR PARTICULARS.

The Brown Hoisting Machinery Co.,

1436 St. Clair Street, Cleveland, O.

217 Havemeyer Building, New York.



1614

In handling coal, many factories and power houses employ the

LINK-BELT

CONTINUOUS APRON FEEDER

when a steady, constant flow of material is required.

In feeding either anthracite or bituminous coal from a hopper to a crusher, the apron feeder materially reduces the power required to operate the crusher by giving it a uniform load. which prevents choking. It also dispenses with a man at the feeding gate.

LINK-BELT ENGINEERING COMPANY,

Nicetown, Philadelphia.

NEW YORK: 49 *Dey St.* — *PITTSBURG:* *Park Bldg.* — *CHICAGO:* *Link-Belt Machinery Co.*

Dangler Gas Ranges.

ABLE AND WILLING.

OUR ability to supply you with Ranges of exceptional merit, and the desire to make our services of real value to you, is the basis upon which we solicit your patronage.

DANGLER STOVE CO. DIV.

OF AMERICAN STOVE CO.,

CLEVELAND, O.

PARKER-RUSSELL MINING AND MFG. CO.,

PROPRIETORS OF THE

OAK HILL GAS RETORT AND FIREBRICK WORKS.

St. Louis Office: 417 Pine Street. **New York Office:** Aldrich Court, 45 Broadway.

WE MAKE A SPECIALTY OF WATER GAS LININGS AND CHECKER BRICK.

Half and Full Depth Benches of Our Own Design, Containing 6, 8 or 9 Retorts.

SLOPERS.—We have perfected plans of INCLINED RETORT BENCHES, designed to meet conditions prevailing in America, and constructed entirely of American materials.

We Build Benches Complete, Ready for Gas Making. Also

RETORT HOUSES,

COAL and COKE CONVEYING MACHINERY.

Plans, Specifications and Estimates Cheerfully Furnished.

CORRESPONDENCE SOLICITED.

FRANK D. MOSES,

Long Distance Telephone, 1922, Trenton, N. J.

TRENTON, N. J.,

Long Distance Telephone, 1922 Trenton, N. J.

Constructing Engineer and Contractor.

Estimates Furnished on any kind of Work in Connection with Gas or Water Plants.

SPECIAL ATTENTION GIVEN TO THE REMODELLING AND EXTENDING OF THE PROPERTIES OF WORKS NOT UP-TO-DATE

CORRESPONDENCE SOLICITED.

GEO. G. RAMSDELL.

DRAKE'S SYSTEM OF INCLINED RETORTS. COAL AND COKE MACHINERY.

P. H. & F. M. ROOTS CO. GAS EXHAUSTERS, HIGH OR LOW PRESSURE.

AMMONIA CONCENTRATING PLANT.

AIR DEVICE for Admitting a Proper Percentage of Air into Purifying Boxes.

Governors, Gas Valves, Cast Iron Specials, Gauges, Photometers, Gas Specialties.

TELEPHONE, 3553 Spring. **530 BROADWAY, NEW YORK CITY.**

FREDERIC EGNER,

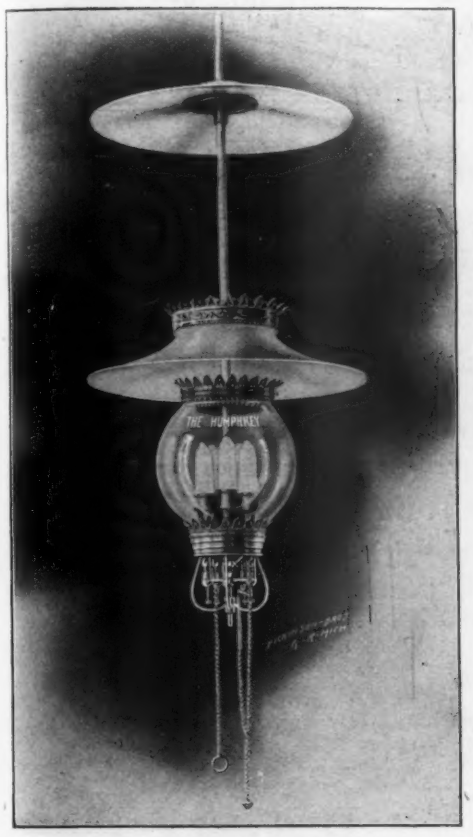
Gas Engineer,

WASHINGTON BANK BUILDING, 12TH & G STS., N. W., WASHINGTON, D. C.,

May be consulted with reference to estimates of cost for new, or appraising actual value of existing works; utility of proposed or patented processes; relative earning power to capitalization, and management. Will NOT undertake to furnish apparatus or material, or to contract for the erection of works.

Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.



THE HUMPHREY LIGHT is made in its entirety in our own shops. Our lamp business is not a side issue jobbed out among various brass workers. We are the designers and makers of the original gas arc light.

GENERAL GAS LIGHT CO.,
KALAMAZOO, MICH.

54 Warren Street, New York.
530 Market Street, San Francisco.

ARTHUR R. CRUSE, President. FRANK FLAVELL, Secretary. AARON E. KEMPER, Treasurer.

Cruse=Kemper Company,

PHILADELPHIA OFFICES: Stephen Girard Building. - - WORKS: Ambler, Pa.

Manufacturers of

Triple, Double and Single=Lift Gasholders,

With or Without Metal Tanks,

Oil and Water Tanks, Purifier Covers, General Plate Metal Work, and Steel Water Towers.

Plans, Specifications and Estimates Promptly Furnished on Request.

COX'S HIGH-PRESSURE FLUID DISCHARGE COMPUTER.

This Computer solves the following formula, which is applicable to Gas, Air and other elastic fluids, flowing through long pipes with high initial pressures:

$$\text{Discharge in cubic feet per hour at atmospheric pressure} = 33.3\sqrt{\frac{d^5 \times (p_1^2 - p_2^2)}{L \times w}}$$

Where d = diameter of pipe in inches,
p_1 = absolute initial pressure in pounds per square inch,
p_2 = absolute terminal pressure in pounds per square inch,
L = length of pipe in miles,
w = specific gravity of the fluid when air = 1.

To Find the Discharge from a Pipe and the Required Size of Pipe.

(1.) Set the specific gravity of the fluid opposite the length of pipe;
(2.) Bring the DIFFERENCE of the initial and terminal gauge pressures opposite the SUM of the initial and terminal gauge pressures;
(3.) Opposite any diameter of pipe will now be found the discharge in cubic feet per hour at atmospheric pressure; and
(4.) Opposite any desired discharge will also be found the required diameter of pipe.

Price of the Computers, in Cloth Case, 6½ x 8 inches, $5 Each, Net.

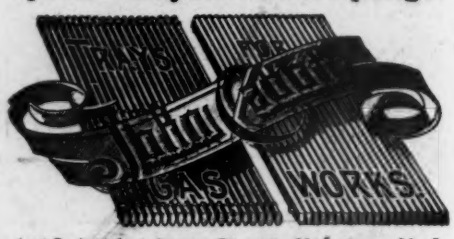
A. M. CALLENDER & CO., 42 PINE ST., N. Y.

P. PLANTINGA PRES. THE W.E. STEINWEDELL SEC.
GAS MACHINERY CO.,
MAIN OFFICE AND SHOPS
CLEVELAND, O.
N.Y. OFFICE 44 BROAD ST
J.A MAYERS
REPRESENTATIVE
COAL & WATER GAS APPARATUS,
PURIFIERS, VALVES,
CONNECTIONS,
ROTARY SCRUBBERS,
WASHERS,
BY PRODUCT MACHINERY.
COMPLETE GAS PLANTS.

Utilize Your Gas Liquor.
NO EXTRA LABOR OR OPERATING EXPENSE.
IMPROVED AMMONIA CONCENTRATOR.
About 100 in use. Write to
STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich

PATENTS, TRADE-MARKS, COPYRIGHTS.
ROYAL E. BURNHAM,
Solicitor of Patents and Counsellor in Patent Causes.
833 Bond Building, Washington, D. C.
Send for Pamphlet on Patents.
1418-tf

Church's Patent Trays.
Reversible; Strongest; Most Easily Repaired.
Special Trays for Iron Sponge.



1412-1416 Adams Street, Hoboken, N. J.
We also Supply the Cheapest and Strongest
•Reversible Bolted Trays•
IN THE MARKET.
SEND FOR BOOKLET AND CIRCULARS.

A
SAMPLE LETTER
FROM A CUSTOMER.

REEVES PREPAYMENT METER CO., NEW HAVEN, CONN.:
Gentlemen--Please send us as early as possible 150 attachments for 3-light and 150 for 5-light meters. We are much pleased with the attachments in use; they are easily and quickly attached to the meter and their working gives us perfect satisfaction.
Yours very truly, **JAMES SOMERVILLE.**
ENGINEER AND SUPERINTENDENT, INDIANAPOLIS GAS COMPANY.

FRED. BREDEL, President. WM. O. VILTER, Vice-President. O. W. GREENSLADE, Secretary and Treasurer.
FRED. BREDEL COMPANY,
ENGINEERS AND BUILDERS OF GAS PLANTS.
Inclined Benches, own system, Recuperative Furnaces, Exhausters, Exhauster Governors, Condensers, Washers, Coolers, Wet Purifying Plants, Purifiers, Oxide Elevators, Hydraulic and Dry Coke Conveyors.
Special High Grade Material for Recuperative Furnaces.
Licensees for ARROLL-FOULIS Charging and Discharging Machines and FRONHAUSER Coke Conveyors. OFFICE, 405 KEENE ST., MILWAUKEE, WIS.

MAIN AND SERVICE LAYING.
Gas and water companies about to lay new mains or services will find it useful to communicate with us. Our gangs are experienced and our plant is completely equipped for street main and service laying in all branches. These are our specialties. We are in a position to quote prices which will attract the attention of the economical manager.
Gas Company References. Correspondence Solicited.
Telephone, 302 Flushing. SULLIVAN BROS., Flushing, N. Y.

Practical Photometry,
By William Joseph Dibdin.
Price, ... $3.00.
FOR SALE BY
A. M. CALLENDER & CO.,
No. 42 Pine Street, New York City.

BRAY BURNERS

Are Used Everywhere,

Because they are the best.
Reliable absolutely.
Accurately marked.
You can't find a city in the world,
with gas, not using them.

All Bray Burners are stamped with Name and Trade Mark.
Refuse Imitations. Send for Blue Book.

WILLIAM M. CRANE COMPANY,

1131 & 1133 Broadway, New York City.

"THE MINER"

Globe
Street and Boulevard
Lamps.

Cheapest and Best.
THOUSANDS IN USE WITH INCANDESCENT BURNERS.
Send for Catalogues.

THOMAS T. W. MINER,
821-823 Eagle Av., N.Y.

"HUNT" SELF-DUMPING AND SELF-RIGHTING COAL TUBS.

This tub requires less labor to shovel the coal into it than any other style of tub. Sizes from ½ to 1 ton in stock, for immediate shipment. Write for our Catalogue 0011 if your are interested in coal handling.

C. W. HUNT COMPANY, - - WEST NEW BRIGHTON, N. Y. NEW YORK OFFICE, 45 BROADWAY.

Mueller Gas Cocks.

B—755.

TOO little is not as much as you pay for, and too much is more paid for than you need.

In **Mueller Gas Cocks** you find a happy medium--not so little metal as to leave them weak, nor yet so much as to make them costly.

Made in 145 styles, seven sizes in each style.

MADE ONLY BY

H. MUELLER MFG. CO.,

DECATUR, ILLS., U. S. A.

THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.

SELF-INSTRUCTION

For Students in Gas Manufacture.

Price, $1.25. For Sale by

A. M. Callender & Co.,

42 Pine Street, New York City.

FINANCES OF

Gas and Electricity Manufacturing Enterprises,

By WM. D. MARKS. Price, $1. For Sale by

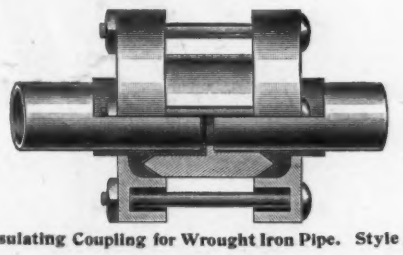
A. M. Callender & Co.,

42 Pine Street, New York City

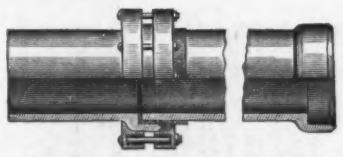
S. R. DRESSER,

BRADFORD, PENNSYLVANIA, U. S. A.,

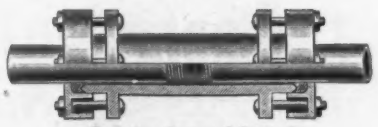
Patentee and Manufacturer of Specialties for Oil and Gas Lines.



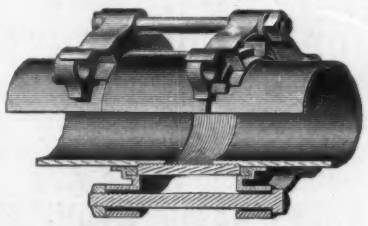
Insulating Coupling for Wrought Iron Pipe. Style 5.



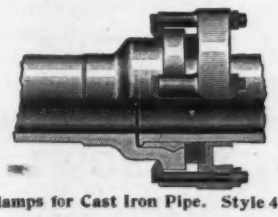
Insulating Coupling for Dresser Bell and Spigot Cast Iron Pipe. Style 6.



Regular Sleeve. Style 2.



Clamp. Style 4.



Clamps for Cast Iron Pipe. Style 4½.

Pipe Couplings, Sleeves, Clamps, Crosses, Tees and Ells.

My Insulating Coupling prevents the destruction of pipe by electrolytic action, in either water or gas lines.

SEND FOR CATALOGUE.

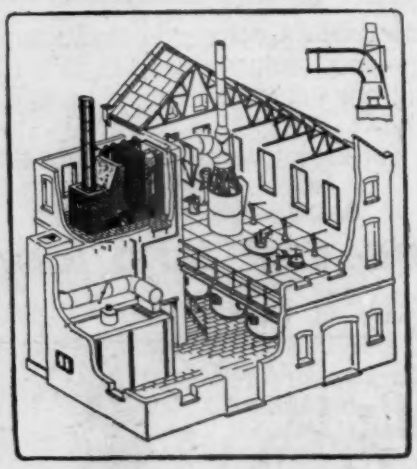
LLOYD CONSTRUCTION COMPANY,
DETROIT, MICH.

GAS WORKS BUILDERS.

Economize Heat in Water Gas Plants,

BY UTILIZING A

Green's Economizer,



To absorb the heat now going to waste when you blow through your superheater to heat the feed water for your boilers to the temperature of the steam. This is now being done at the Poughkeepsie Gas Works, Poughkeepsie, N. Y. : : : : :

Write for full particulars how this is accomplished, the saving effected, and the advantages gained, to the

GREEN FUEL ECONOMIZER CO.,
MATTEAWAN, N. Y.

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE.

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,
238 Java Street, Brooklyn, N. Y.

GEORGE R. ROWLAND,
Formerly with the Continental Iron Works.

Draughtsman and Constructing Engineer.

Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.

Office, No. 245 Broadway, N. Y. City.

Bristol's Recording
PRESSURE GAUGE.

For continuous records of **Street Gas Pressure.** Simple in construction, accurate in operation and low in price.

Fully Guaranteed. Send for Circulars.

THE BRISTOL CO.,
Waterbury, Conn.

Silver Medal, Paris Exposition.

Gas Analyses of All Sorts and Conditions,
—OR—
Analyses of Solid and Liquid Materials as Well,

That are needed by Gas Companies at any time in the conduct of their business, may be obtained from

DR. W. H. BIRCHMORE,
1421-tf 341 ADELPHI ST., BROOKLYN, N. Y.

Gas Engineer's Pocket-book, —BY— HENRY O'CONNOR.
Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works. PRICE, $3.50. For Sale by
A. M. CALLENDER & CO. 42 Pine St., N.Y. City.

The Advertisement of the

P. H. & F. M. ROOTS CO., Mfrs. of Gas Exhausters, Blowers, etc.,

Connersville, Ind., - - - 120-122 Liberty Street, New York City,

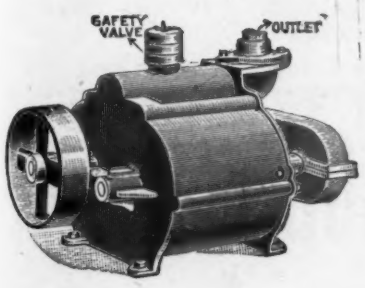
Occupies this Space Every Alternate Week.

Connelly Iron Sponge and Governor Co.,

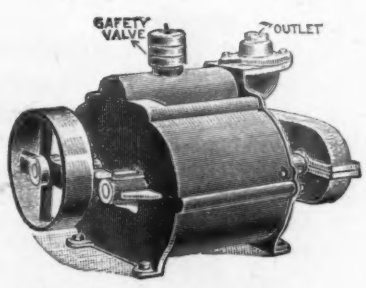
395 Broadway, New York City.

TELEPHONE, 3033 Franklin. - - - CABLE ADDRESS, Governorco.

GEO. G. RAMSDELL, General Manager. S. F. HAYWARD, Treasurer.

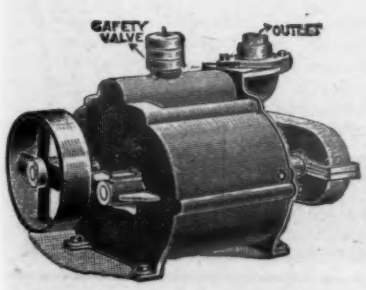


REVIVIFYING IN SITU.



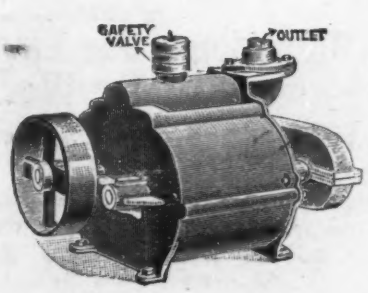
An inexpensive device for admitting air into purifying boxes. Belted direct to exhauster shaft the speed of blower is automatically regulated. Size shown in cut, 10 inches by 10½ inches by 16 inches, has a capacity of 172 cubic inches per rev= olution, and can be speeded to admit percentage of air desired. Specially designed for gas com= panies. A large number of these machines are now in daily use, giving entire satisfaction.

CORRESPONDENCE SOLICITED.



Connelly Iron Sponge and Governor Co.,

395 BROADWAY, NEW YORK CITY.



"Elbow Specials Sleeves, etc." "Elmorgan" Pipe Fittings

M. J. DRUMMOND & CO.

MANUFACTURERS OF

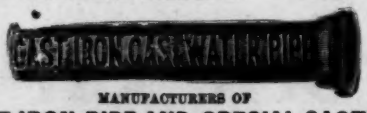
CAST IRON FLANGE GAS and WATER PIPE

GENERAL SALES OFFICE, 192 BROADWAY, NEW YORK.

GEORGE ORMROD, Manger. & Treas., Emaus, Pa.
JOHN DONALDSON, Prest., Betz Bldg., Phila., Pa.

EMAUS PIPE FOUNDRY.

DONALDSON IRON COMPANY. EMAUS, PA.



MANUFACTURERS OF

CAST IRON PIPE AND SPECIAL CASTINGS

FOR WATER AND GAS.

Also, FLANGE PIPE, LAMP POSTS, Etc.

GAS TAPPING MACHINES

—FOR—

Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

Geo. Light,
DAYTON, O.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Consulting Engineers.

Builders of UP-TO-DATE Machinery and Appliances for Coal and Water Gas Plants. :: :: :: :: ::

PLANS, SPECIFICATIONS AND ESTIMATES PREPARED.

AMERICAN OFFICE:
269 Front St., East, Toronto, Canada.

THE

Valuation of Gas, Electricity and Water Works

FOR ASSESSMENT PURPOSES.

THOS. NEWBIGGING, M.Inst.C.E., and WM. NEWBIGGING, Assoc.M.Inst.C.E.

With an Appendix of Decided Cases.

Second Edition. Price $2. For Sale by

A. M. CALLENDER & CO.,
42 Pine Street, N. Y. City.

WARREN FOUNDRY AND MACHINE CO.,

Established 1856. Works at Phillipsburgh, N. J.

New York Office, 160 Broadway.

CAST IRON WATER AND GAS PIPE,

FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

SAFETY GAS MAIN STOPPER COMPANY,

For Shutting Off Gas in Mains

Temporarily during alterations and repairs. : : : :

Any size gas main can be shut off in 30 seconds. : : :

STOPPERS SENT ON TRIAL.

Address: SAFETY GAS MAIN STOPPER CO., 108 E. 117th St., New York City.

Instantaneous Water Heaters

FOR GAS.

With our experience, ability and facilities we produce

Humphrey Crescent Instantaneous WATER HEATERS.

Simple construction.
Perfect workmanship.
Highest efficiency.
Prices surprisingly low.

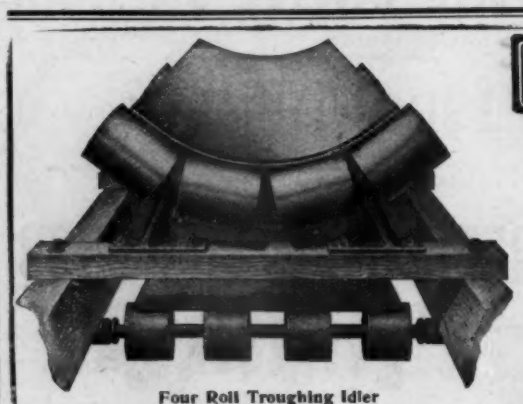
No. 2, Price, $35.

GUARANTEED.

For general use and long continued satisfaction, we recommend this No. 2 Heater, the handsomest ever made.

WRITE TO US.

HUMPHREY CO., { KALAMAZOO, MICH.



Four Roll Troughing Idler
FOR WIDE BELTS.
The positions of the rolls conform to a natural and uniform curve of the belt.

BELT CONVEYORS

EQUIPPED WITH

BALL BEARING ROLLS

Possess greater efficiency, consume less power, and the belts last much longer than when any other type of roll is employed.

Permit us to tell you why and to submit plans and estimates.

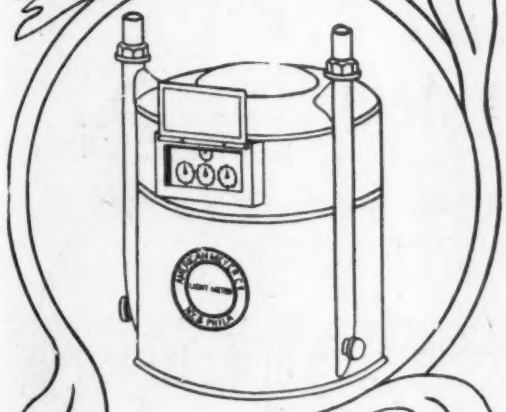
The Link-Belt Machinery Co.
Link-Belt Engineering Co. Philadelphia Chicago, U.S.A.

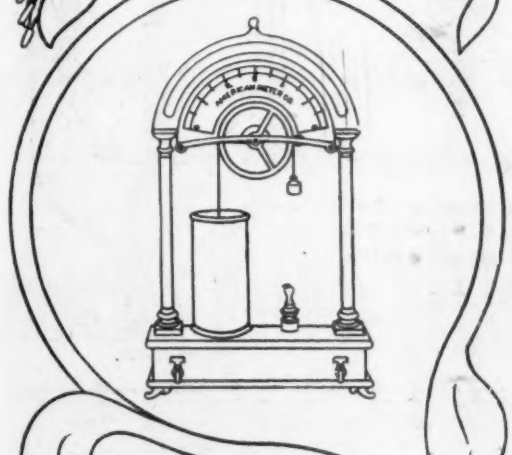
(Copyrighted, 1894, by the AMERICAN METER CO.)

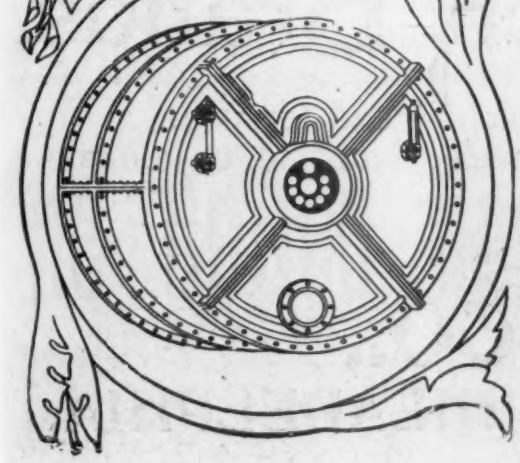
AMERICAN METER CO.

ESTABLISHED 1836. INCORPORATED 1863.

NEW YORK,
PHILADELPHIA,
CHICAGO,
ST. LOUIS,
SAN FRANCISCO.







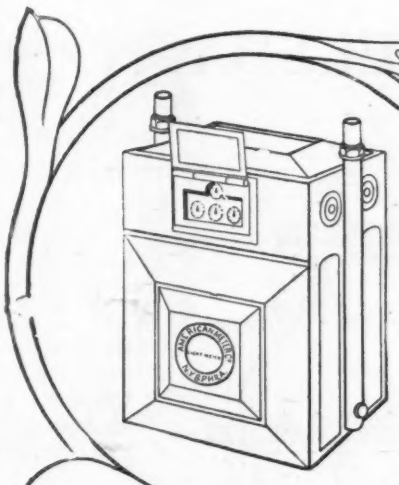
PUBLIC LIGHTING TABLE.

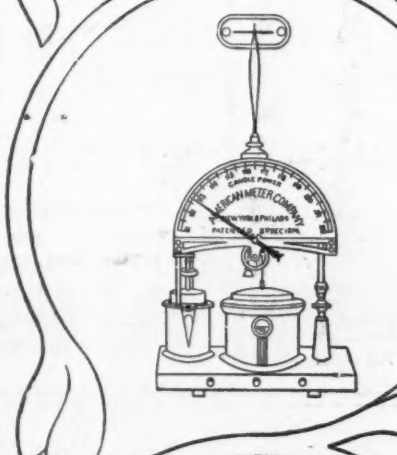
APRIL, 1904.

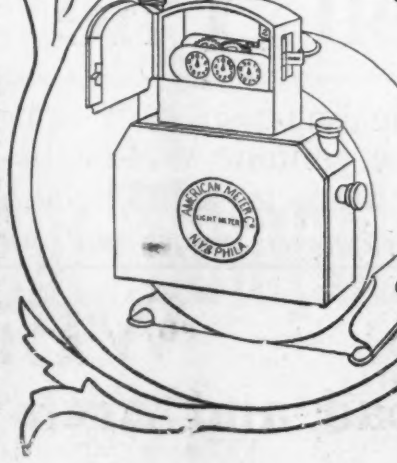
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Fri.	1	6.50 PM	9.00 PM	6.10	4.55
Sat.	2	6 50	10.00	6.15	4.40
Sun.	3	7.00	11.10	6.15	4.40
Mon.	4	7.00	12.10 AM	6.15	4.40
Tue.	5	7.00	1.00	6.15	4.40
Wed.	6	7.00	1.50	6.15	4.40
Thu.	7	7.00 LQ	2.30	6.15	4.40
Fri.	8	7.00	3.10	6.15	4.40
Sat.	9	7.00	3.50	6.25	4.30
Sun.	10	7.10	4.20	6.25	4.30
Mon.	11	7.10	4.30	6.25	4.20
Tue.	12	7.10	4.30	6.25	4.30
Wed.	13	7.10	4.30	6.25	4.30
Thu.	14	7.10	4.30	6.25	4.30
Fri.	15	7.10 NM	4.30	6.25	4.30
Sat.	16	7.10	4.30	6.30	4.20
Sun.	17	7.10	4.20	6.30	4.20
Mon.	18	7.10	4.20	6.30	4.20
Tue.	19	7.10	4.20	6.30	4.20
Wed.	20	10.30	4.20	6.30	4 20
Thu.	21	11.20	4.20	6.30	4.20
Fri.	22	12.10 AM FQ	4.20	6.30	4 20
Sat.	23	12.50	4.20	6.40	4.10
Sun.	24	1.30	4.10	6.40	4.10
Mon.	25	2.10	4.10	6.40	4.10
Tue.	26	2.50	4.10	6.40	4.10
Wed.	27	3.30	4.10	6.40	4.10
Thu.	28	No L.	No L.	6.40	4.10
Fri.	29	No L. FM	No L.	6.40	4.10
Sat.	30	No L	No L.	6.45	4.00

TOTAL HOURS LIGHTING DURING 1904.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	225.00	January	423.20
February	205.40	February	367.40
March	187.40	March	355.35
April	169,50	April	298.50
May	152.30	May	264.50
June	137.20	June	234.25
July	138.50	July	243.45
August	151.00	August	280.25
September	164.40	September	321.15
October	191.30	October	374.30
November	210.30	November	401.40
December	237.10	December	433.45
Total, yr.	2171.40	Total, yr.	4000.00



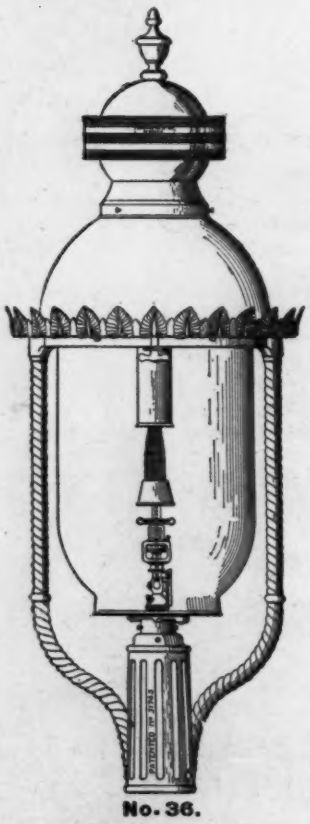




NEW YORK, 33 Nassau Street.
BOSTON, 814 Beacon Building.
PHILADELPHIA, Broad and Arch Streets.
ST. LOUIS, 712 Roe Building.
CHICAGO, Foot of Orleans Street.
SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others interested in Municipal and Outside Lighting.

No. 38.

AN underlying principle in business is to show an increase each year---to grow. The astute dealer not only seeks to retain this year's customers, but to attract new trade next year.

The formula is simple-

THIS SHIELD IS THE WELSBACH TRADE MARK.

IT IS A GUARANTEE AND A PROTECTION.

Sell The Welsbach Brands.

The imitation stuff is bad for the customer---which is bad for you.

The genuine Welsbachs---Burners or Mantles---make satisfied customers---keep customers---MAKE NEW ONES.

And your profit isn't merely dollars and cents.

WELSBACH CO.,

Broad and Arch Sts., PHILADELPHIA.

THE UNITED GAS IMPROVEMENT COMPANY

For the Year Ending December 31, 1903, has been Awarded Contracts in the Following Places for

Standard Double-Superheater Lowe Water Gas Apparatus.

Rochester, N. Y.	Chester, Pa.	Savannah, Ga.
Baltimore, Md.	Lynn, Mass.	New York (Central Union Co.)
Chicago, Ills.	Newark, N. J.	Cicero, Ills.
Amesbury, Mass.	Washington, D. C.	Chicago (Ogden Co.)
Aberdeen, S. D.	Boone, Ia.	Easton, Pa.
Winsted, Conn.	Pueblo, Col.	Lawrence, Mass.
Canon City, Col.	Charlotte, N. C.	Council Bluffs, Ia.
Schenectady, N. Y.	Fall River, Mass.	Chattanooga, Tenn.
Hagerstown, Md.	Duluth, Minn.	Tuckerton, N. J.
Malden, Mass.	New York (Mutual Co.)	Springfield, O.
Bridgeport, Conn.	Waltham, Mass.	Easton, Pa. (2d contract).
Albert Lea, Minn.	Dover, Del.	Mobile, Ala.
Brooklyn, N. Y.	York, Pa.	Conshohocken, Pa.
Kansas City, Kas.	Minneapolis, Minn.	Mason City, Ia.
Hempstead, N. Y.	Allentown, Pa.	

TOTAL SETS FOR 1903, ... 62
TOTAL DAILY CAPACITY, ... 62,950,000 cubic feet.
TOTAL SETS TO DATE, ... 508
TOTAL DAILY CAPACITY, ... 362,780,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES,
FIRE BRICK and FIRE CLAY SPECIALTIES.

Ground Fire Clay, Fire Sand and Ground Fire Brick in Barrels and Bulk.

SOLE MANUFACTURERS OF THE

FLEMMING GENERATOR GAS FURNACE

Brooklyn Fire Brick Works,

OFFICE AND WORKS:
88 VAN DYKE ST., BROOKLYN, N. Y.
MANUFACTURERS OF
CLAY GAS RETORTS & SETTINGS, GENERATOR LININGS. SPECIALTIES.

Established 1854. Incorporated 1869.

LACLEDE
Fire Brick Manufg. Co.,

Manufacturers of { GAS RETORTS . .
FIRE BRICK . . .
RETORT SETTINGS

Water Gas Cupola Linings, Fire Clay, Etc.

Proprietors for the U. S., Coze System of Inclined Benches.

Estimates Furnished on Application for Most Successful Style of Construction.

Also for Free-Firing and Full and Half-Depth Regenerative Benches, for Burning either Coal or Coke in the Furnaces.

Office:
Cor. Manchester and Sulphur Avenues, St. Louis, Mo.

Established 1845. Reorganized 1902.

The Kreischer Brick Mfg. Co.,

Manufacturers of the very best quality of Clay Retorts, Blocks, Tiles, Settings and Firebrick of every description.

Also Miners and Shippers of Fireclay, Fire Sand, Ground Brick in Barrels.

WORKS: KREISCHERVILLE, STATEN ISLAND.
OFFICE: 119 E. 23D STREET, NEW YORK CITY

SEND FOR DESCRIPTIONS OF

Adam Weber Sons

NEWEST DESIGN

"Modern Ironwork,"

NEWEST DESIGN FOR

Improved Furnace Firing,

AND

Independent Retort Settings.

PATENTS APPLIED FOR.

ISAAC C. BAXTER, President. ESTABLISHED 1864. PETER YOUNG, Sec'y and Treas.

Works.
LOCKPORT STATION, PA.

JAMES GARDNER, JR., CO.,

Address all communications to
JAMES GARDNER, JR., CO., Room 202 Lewis B'l'dg.
PITTSBURGH, PA.

Successor to WILLIAM GARDNER & SON.

Fire Clay Goods for Gas Works.

HENRY MAURER & SON,

(ESTABLISHED 1856.)

EXCELSIOR FIRE BRICK & CLAY

RETORT WORKS

WORKS, Perth Amboy, N. J.
OFFICE, 418 to 422 East 23d St., N. Y.

Clay Gas Retorts,

BENCH SETTINGS,

Fire Brick, Tiles, Etc.

GEROULD'S IMPROVED RETORT CEMENT

A Cement of great value for patching retorts, putting on mouthpieces, making up all bench-work joints, lining blast furnaces and cupolas. This cement is mixed ready for use. Economic and thorough in its work. Fully warranted to stick.

Price List, f.o.b. BLOOMINGTON, INDIANA.
In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
In Kegs less than 100 " " 7 " "

C. L. GEROULD, BLOOMINGTON, IND.

For orders East of Buffalo, N. Y., or Pittsburg, Pa., freight will be paid to these points.

The Gas Engineer's Pocket-Book,

By HENRY O'CONNOR.

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

For Sale by

A. M. CALLENDER & CO., 42 Pine Street, New York City.

THEO. J. SMITH, Prest. J. A. TAYLOR, Sec.
A. LAMBLA, Vice-Prest. and Supt.

BALTIMORE
RETORT & FIRE BRICK CO.

MANUFACTORY AT
LOCUST POINT, BALTIMORE, MD.

Clay Retorts, Blocks & Tiles

FIRE BRICK, FIRE CLAY,
AND FIRE CEMENT.

Our Improved Half and Full Depth Benches have been Adopted by Many Gas Companies.

WALDO BROS., 102 MILK ST., BOSTON, MASS.
Sole Agents for New England States.

JOHN DELL,
President and General Manager.

MISSOURI FIRE BRICK CO.,

ESTABLISHED 1882.

MANUFACTURERS OF

Gas Retorts, Bench Settings, Fire Brick, Cupola Linings, Etc.

We are the **Exclusive Agents** *for the* **Mitchell Patent Benches,** *Constructed with Half or Full Depth Furnaces, to Burn either Coal or Coke, and Arranged for Front or* **Rear Clinkering.** **The Mitchell** *is the* **Original Coal Firing Bench.** *We also Erect Plain Benches with* **One** *to* **Six Retorts.**

YOUR CORRESPONDENCE IS RESPECTFULLY SOLICITED.

City Office:
411 Olive Street,
Continental Bank,
ST. LOUIS, MO.

Bronder Patent Stoking Machinery.

Three-Scoop and Three-Rake Charging and Discharging Machines are operating in New York, Newark, N. J., Philadelphia, Worcester, Mass., Mt. Vernon, N. Y., Toronto and Montreal, Canada.

Four-Scoop and Four-Rake Charging and Discharging Machines are being furnished for Detroit, Mich.

These are the only machines that will draw or charge simultaneously three or four retorts (vertically) and handle from 42 to 60 retorts in from 25 to 30 minutes, lid opening and closing and filling of furnaces included.

Hot Coke Conveyor, Quencher and Steam Exhauster, operating in Toronto, Can., working in water-sealed flue, rollers being protected from heat and grit.

COAL CRUSHERS, CONVEYORS AND BINS. TURNTABLES FOR MACHINES.

Labor-Saving Machines for Handling Coal and Coke from Coal Cars to Coke Yard or Bins, a Specialty.

G. A. BRONDER,
Contracting Engineer and Builder.
229 BROADWAY. NEW YORK.

SCIENTIFIC BOOKS.

ELECTRIC GAS LIGHTING. By H. S. Norrie. 50 cents.

GAS ANALYST'S MANUAL. By J. Abady. $6.50.

COX'S GAS FLOW COMPUTER. $2.50.

FIELD'S ANALYSIS, 1902. $5.

HUGHES' GAS WORKS. $1.65.

POOLE ON FUELS. By Herman Poole. $3.

GAS ENGINEER'S POCKET-BOOK. By Henry O'Connor $3.50.

TECHNICAL GAS ANALYSIS. By Winkler & Lunge. $4.

GAS CONSUMER'S HANDYBOOK, by Wm. Richards. 20 cents.

PRACTICAL TREATISE ON HEAT. By Thomas Box. 2d edition. $5.

PRACTICAL PHOTOMETRY: A Guide to the Study of the Measurement of Light. By W. J. Dibdin. $3.

CHEMICAL TECHNOLOGY: Vol. I., *Fuel and Its Applications*, $5. Vol. II., *Lighting*, $4.

IRONWORK: Practical Designing of Structural Ironwork. By H. Adams. $3.50.

HEMPEL'S GAS ANALYSIS, $2.25.

SELF-INSTRUCTION FOR STUDENTS IN GAS MANUFACTURE. $1.25.

LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES. By E. A. Brayley Hodgetts. $2.50.

PRACTICAL HANDBOOK ON GAS ENGINES, by G. Lieckfeld. $1.

HEAT A MODE OF MOTION. By John Tyndall. $2.50.

THEORY OF HEAT. By J. Clerk-Maxwell. $1.50.

MANUAL FOR GAS ENGINEERING STUDENTS. By D. Lee. 40 cents.

AMMONIA AND AMMONIUM COMPOUNDS. By Dr. R. Arnold. $2.

A TREATISE ON THE COMPARATIVE COMMERCIAL VALUES OF GAS COALS AND CANNELS. By D. A. Graham. $3.

A TEXT BOOK OF INORGANIC CHEMISTRY. By Prof. Victor Von Richter. $2.

ILLUMINATING AND HEATING GAS. By W. Burns. $1.50

HANDBOOK FOR MECHANICAL ENGINEERS. By H. Adams. $2.50.

TREATISE ON MASONRY CONSTRUCTION. Baker. $5.

GAS ENGINEER'S LABORATORY HANDBOOK. By Jno. Hornby. $2.50.

FINANCES OF GAS AND ELECTRICITY MANUFACTURING ENTERPRISES. By Wm. D. Marks. $1.

PRACTICAL PLUMBING. By P. J. Davies. Vol. I. $3, Vol. II. $4.50.

AMERICAN PLUMBING. By Alfred Revill. $2.

A COMPARISON BETWEEN THE ENGLISH AND FRENCH METHODS OF ASCERTAINING THE ILLUMINATING POWER OF COAL GAS. $1.60.

ELECTRICITY.

INDUSTRIAL PHOTOMETRY, with Special Application to Electric Lighting. By A. Palaz, Sc.D. $4.

ELEMENTS OF ELECTRIC LIGHTING, Including Electric Generation, Measurement, Storage and Distribution. By Philip Atkinson. $1.50.

ELECTRIC TRANSMISSION OF ENERGY. By G. Kapp. $3.50.

ELECTRICIAN'S POCKET-BOOK. By Monroe and Jamieson. $2.50.

DYNAMO BUILDING. By F. W. Walker. 50 cents.

DOMESTIC ELECTRICITY FOR AMATEURS. By E. Hospitalier. $2.50.

PRACTICAL MANAGEMENT OF DYNAMOS AND MOTORS. $1.

PRACTICAL GUIDE TO THE TESTING OF INSULATED WIRES AND CABLES. $1.

ELECTRIC LIGHTING, by Francis B. Crocker. $3.

ELECTRIC LIGHT FITTING. $2.

PRACTICAL ELECTRICITY. $2.50.

ELECTRICITY FOR ENGINEERS. $2.50.

ELECTRICITY, Its Theory, Sources and Applications. By John T. Sprague. $6.

The above will be forwarded upon receipt of price. If sent by mail or express, postage or express charges must be added to above prices. We take especial pains in securing and forwarding any other Works that may be desired, upon receipt of order. All remittances should be made by check, draft, or post office money order. No books sent C.O.D.

A. M. CALLENDER & CO., 42 PINE ST., NEW YORK.

JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

THE PERKINS COMPANY,

228 and 229 Produce Exchange, New York City.

TIDEWATER SALES AGENTS FOR THE FOLLOWING:

Ocean Mine Youghiogheny Gas Coal,
Old Kentucky Shale and O. K. Boghead.

SHIPMENTS FROM NEW YORK, PHILADELPHIA, BALTIMORE AND NORFOLK.

BERWIND-WHITE COAL MINING COMPANY'S

Ocean Westmoreland Gas Coal.

Offices:
Washington Building, New York.
Betz Building, Philadelphia.

STRICTLY High Grade. . . . .
Carefully Prepared.
For Gas Making or
Heavy Steaming. .

A. C. M. AZOY, General Agent, 1 Broadway, New York.

JEFFREY ELEVATORS FOR ALL KINDS OF WORK.

COAL HANDLING MACHINERY.

COKE CRUSHERS.

SHAKING SCREENS.

POWER TRANSMISSION MACHINERY.

ASHES HANDLING MACHINERY.

SEND FOR CATALOGUE.

THE JEFFREY MFG. CO.,

COLUMBUS, O., U. S. A.

NEW YORK, CHICAGO, DENVER, BUFFALO, PHILADELPHIA.

The Gas Engineer's Laboratory Handbook,

By JOHN HORNBY, F.I.C. Price, $2.50.

Orders may be sent to

A. M. CALLENDER & CO., 42 Pine St., N. Y.

COAL TAR
— AND —
AMMONIA.

Third and Enlarged Edition.

BY

GEORGE LUNGE, Ph.D.

Price, $15. For Sale by

A. M. CALLENDER & CO.,

42 Pine Street, New York City.

ELECTRIC GAS LIGHTING.

How to install electric gas igniting apparatus, including the jump spark and multiple systems for use in houses, churches, theaters, halls, schools, stores or any large building. Also, the care and selection of suitable batteries, wiring and repairs.

By H. S. NORRIE.

Price, 50 cents. Orders may be sent to

A. M. CALLENDER & CO., 42 PINE ST., N. Y CITY.

HUGHES' "GAS WORKS,"

Their Construction and Arrangement, and the Distribution of Coal Gas.

Originally written by SAM'L HUGHES, C.E. Rewritten and much enlarged by WM. RICHARDS, C.E.

Eighth Edition, Revised, with Notices of Recent Improvements. Price, $1.65.

A. M. CALLENDER & CO., 42 PINE ST., N. Y. CITY.

KELLER ADJUSTABLE COKE CRUSHER.

Strong, Simple, Durable. Will Crush any Size Desired.

C. M. KELLER,
Sec. & Supt. Gas Lt. & Coke Co.,
Columbus, Ind.
Correspondence Solicited.

Do You Wish to Know

what size of pipe to use to convey any quantity of gas, any distance, with any loss of pressure and any initial or final pressure? Then use

Cox's Gas Flow Computer,

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

Price, 6.5 x 8 inches, in cloth case, $2.50.
For sale by

A. M. Callender & Co., 42 Pine St., N. Y.

POOLE ON FUELS.

THE CALORIFIC POWER OF FUELS.

By HERMAN POOLE, F.C.S.

Second Edition. Price, $3. For Sale by

A. M. CALLENDER & CO., 42 Pine St., N.Y. City.

BINDER for the JOURNAL.

Price, $1.00.

A. M. CALLENDER & CO., 42 Pine Street, N.Y.

EDMUND H. McCULLOUGH, President. CHAS. F. GODSHALL, Treasurer. H. C. ADAMS, Secretary. HENRY WHARTON, Assistant Secretary.

THE WESTMORELAND COAL CO.

Chartered 1854.

Mines situated on the Pennsylvania and the Baltimore and Ohio Railroads, in Westmoreland County, Pa.

POINTS OF SHIPMENT:

PHILADELPHIA, BALTIMORE, SOUTH AMBOY, N. J.,
WATKINS (SENECA LAKE), N. Y.

Since the commencement of operations by this Company its well-known Coal has been largely used by the Gas Companies of New England and the Middle States, and its character is established as having no superior in gas-giving qualities, and in freedom from sulphur and other impurities.

Principal Office, 224 South 3d St., Phila., Pa.

SUN COMPANY,

PRODUCER, REFINER, SHIPPER AND EXPORTER OF

Petroleum and All Its Products.

Pittsburg, Pa., and Philadelphia, Pa.

THE SUN OIL CO.

Gas Oil, Gas Naphtha,
Refined Oil, Lubricating Oils.

Toledo, O., and Pittsburg, Pa.

PRACTICAL PHOTOMETRY,
By WILLIAM JOSEPH DIBDIN,
PRICE, $3. FOR SALE BY
A. M. CALLENDER & CO., 42 Pine Street, New York City.

Standard Oil Company,

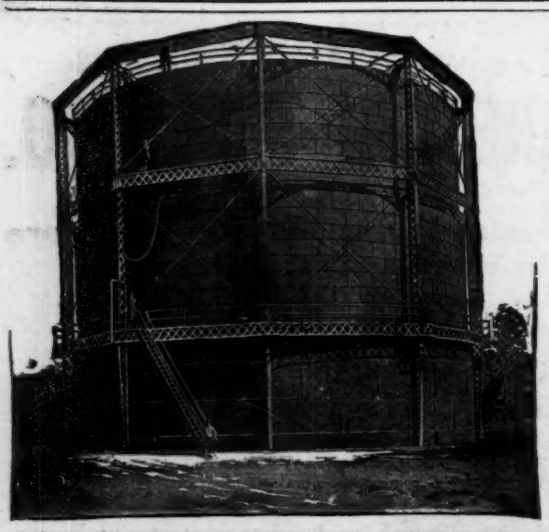
GAS NAPTHA DEPARTMENT.

GAS NAPTHA.

GAS OIL.

Correspondence Solicited.

26 Broadway, New York City.



DAVIS & FARNUM MFG. CO.,

WALTHAM, MASS.

Principal Office & Works, Waltham, Mass. Boston Office, R'm 18, Vulcan Bldg., 8 Oliver St.

Single, Double and Triple-Lift Gasholders of any Capacity. Tubular, Pipe and Sinuous Friction Condensers of all Sizes.

Steel Tanks for Gasholders, Iron Roof Frames and Floors, Purifying Boxes, Center Seal or Valve Connections, Bench Work, Reversible Lime Trays.

Self-Sealing and Pressed Steel Mouthpiece Lids.

Coke Barrows, Coal Wagons, and all Apparatus Requisite for a Complete Gas Works.

Also, Gas and Water Pipe, Flanged Pipe, Sugar House Work, and Special Castings of all Descriptions.

BAXTER & YOUNG,

CONTRACTING AND CONSULTING GAS ENGINEERS.

Examination and Values Ascertained of Artificial and Natural Gas Properties.

COMPLETE GAS WORKS ERECTED.

Artificial and Natural Gas Mains Furnished and Laid.

GAS PROPERTIES PURCHASED.

OFFICE: WAYNE COUNTY BANK BUILDING,

Rooms 201 & 202. DETROIT, MICH.

A. E. BOARDMAN, C. E.,

Consulting and Contracting Engineer.

Particular attention given to Gas, Water and Electric Plants. Long and successful experience with the problem and practice of

Filtration for Public Water Supply.

Edison Building, 42 and 44 Broad St.,

NEW YORK CITY.

DAVID LEAVITT HOUGH,

Consulting Engineer

AND

CONTRACTOR,

PARK ROW BUILDING, N. Y.

Geo. Shepard Page's Sons.

GAS MACHINERY.

Correspondence Solicited.

180 Fulton Street, New York City.

Established 1876.

National Paint Works.

SPECIALISTS IN PAINTS FOR METAL SURFACES.

We Sell 60 Per Cent. of the Gas Companies of the U. S. their Paint. "Nuff said."

Great Northern Bldg., Chicago. Williamsport, Pa. 92 William Street, New York City.

KERR MURRAY MANUFACTURING COMPANY,

Engineers and Manufacturers

APPARATUS FOR COAL GAS PLANTS,

SINGLE AND DOUBLE-LIFT GASHOLDERS AND STEEL TANKS,

Latest Improved

ROTARY EXHAUSTERS, P. & A. TAR EXTRACTORS, AMMONIA WASHERS,

CONDENSING, SCRUBBING AND PURIFYING APPARATUS.

Street Specials and Valves.

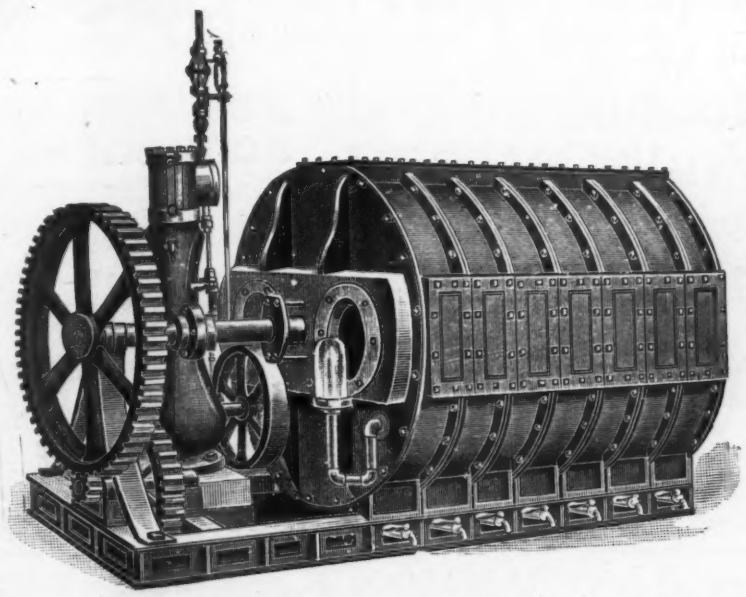
ADDRESS:

KERR MURRAY MANUFACTURING COMPANY, FORT WAYNE, IND.

BARTLETT, HAYWARD & CO.

BALTIMORE, MD.

Designers and Builders of Gas Works.



Sole Lessees the Wilkinson Water Gas Process.

PATENT STANDARD WASHER-SCRUBBER.

The best apparatus for the extraction of all Ammonia and a large proportion of Carbonic Acid and Sulphureted Hydrogen. The Scrubber has been materially improved and is provided with patented Wooden Segmental Grids, instead of Metallic Discs, thus reducing the weight on shaft and power for operating same.

Coal and Water Gas Installations of the Most Modern and Complete Types.

BENCHES WITH INCLINED RETORTS.

System Stettiner Chamotte Fabrik, Actien Gesellschaft, of Stettin, Germany.

GASHOLDERS OF ALL SIZES.

General Western Agents, THE LLOYD CONSTRUCTION CO., of Detroit, Mich.

QUINTARD IRON WORKS,

N. F. PALMER,

Foot of 12th St. & East River, New York,

MANUFACTURERS OF

GAS APPARATUS.

Complete Works Erected.

FREDERICK W. FLOYD, Engineer.

ALEX. C. HUMPHREYS, M.E., M. Inst. C.E. ARTHUR G. GLASGOW, M.E., M. Inst. C.E.

HUMPHREYS & GLASGOW,

BANK OF COMMERCE BLDG., 31 Nassau Street, New York.

38 VICTORIA STREET, London S.W., England.

CONSULTING GAS AND ELECTRIC LIGHT ENGINEERS.

PROPERTIES PURCHASED.

COMPLETE EXAMINATIONS MADE.

R. D. WOOD & CO.,

400 CHESTNUT ST., PHILADELPHIA,

MANUFACTURERS OF

Cast Iron Pipe.

HEAVY LOAM CASTINGS,

Dunham Specials,

Hydraulic Work,

LAMP POSTS, VALVES, ETC.,

Gas Power Plants with Producers.

BUILDERS OF

Gasholders.

Single, Double and Triple Lifts, with or without Metal Tanks.

PURIFIERS, CONDENSERS, SCRUBBERS, BENCH WORK.

Cutler's Patent Freezing Preventer for Holder Cups.

ISBELL-PORTER CO.,

ENGINEERS AND CONTRACTORS FOR THE

Construction and Extension of Gas Works.

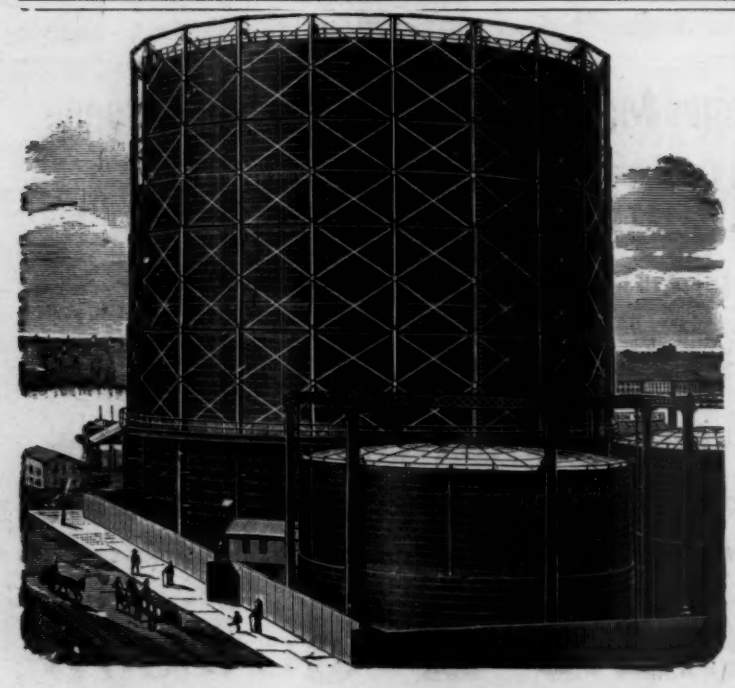
TOTAL ROTARY AMMONIA SCRUBBERS SOLD,

98,806,000 Cu. Feet Daily Capacity.

TOTAL WALKER TYPE TAR EXTRACTORS SOLD,

34,900,000 Cu. Feet Daily Capacity.

OFFICE AND WORKS: Bridge an Ogden Streets, Newark, N. J.



The Continental Iron Works,

THOMAS F. ROWLAND, President.
WARREN R. HILL and CHAS. H. CORBETT, Vice-Presidents.
THOMAS F. ROWLAND, Jr., Secretary & Treasurer.

West and Calyer Sts. (Near 10th & 23d St. Ferries)

NEW YORK, Borough of Brooklyn.

BUILDERS OF

Gas Holders.

Single and Multiple Section Gas Holders a Specialty.

STEEL GAS HOLDER TANKS.

BENCH CASTINGS, RETORT LIDS.

Hydraulic Mains, Condensers, Scrubbers, Purifiers, Valves, Etc.

Self-Sealing Retort Mouthpieces & Lids

For Round, Oval, or "D" Retorts.

THE GAS ENGINEER'S LABORATORY HANDBOOK,

By JOHN HORNBY, F.I.C.

PRICE, - - - - - - - $2.50.

A. M. CALLENDER & CO., No. 42 Pine Street, New York City.

THE STACEY MANUFACTURING COMPANY,

MANUFACTURERS AND BUILDERS OF

GASHOLDERS, STEEL TANKS,

AND ALL IRONWORK AND MACHINERY REQUIRED IN A GAS PLANT.

In fact, we manufacture and erect any and all apparatus for a complete Gas Works, from the coal pile to street mains.

The Only Authorized Manufacturers of the "Chollar System of Gas Purification."

PLANS, SPECIFICATIONS AND ESTIMATES CHEERFULLY FURNISHED ON REQUEST.

OFFICES:

No. 239 Mill Street, CINCINNATI, OHIO. 'Phone, West 690.

RITER-CONLEY MFG. CO.,

GASHOLDERS, with or without Steel Tanks.

Purifiers, Condensers, Scrubbers, Oil Tanks, Smoke Stacks

STEEL ROOFS and BUILDINGS.

PLATE AND STRUCTURAL WORK OF EVERY DESCRIPTION.

GENERAL OFFICE: Pittsburg, Pa. EASTERN OFFICE: 39-41 Cortlandt St., New York City.

WM. HENRY WHITE,

EDISON BUILDING, No. 44 BROAD STREET, = = = NEW YORK CITY,

ENGINEER AND CONTRACTOR FOR THE

ERECTION AND EXTENSION OF

GAS, WATER, AND ELECTRIC LIGHT WORKS.

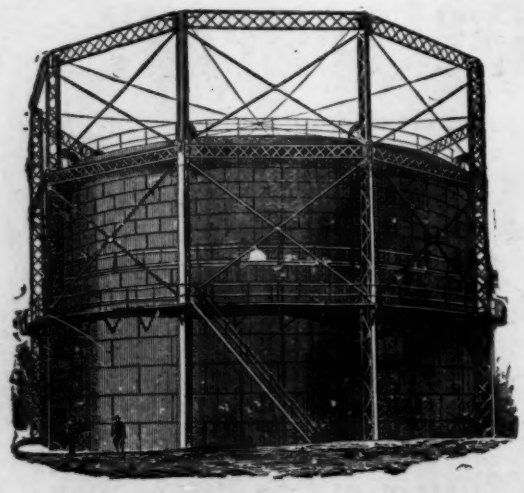
Correspondence with Gas Companies contemplating extending or improving their Plants respectfully invited. Plans and Estimates Furnished.

1903 DIRECTORY 1903

OF AMERICAN GAS COMPANIES.

Price, - - - - - - - - $5.00.

A. M. CALLENDER & CO., - - No. 42 Pine Street, New York.



1842 ※ Deily & Fowler, ※ 1904

LAUREL IRON WORKS.

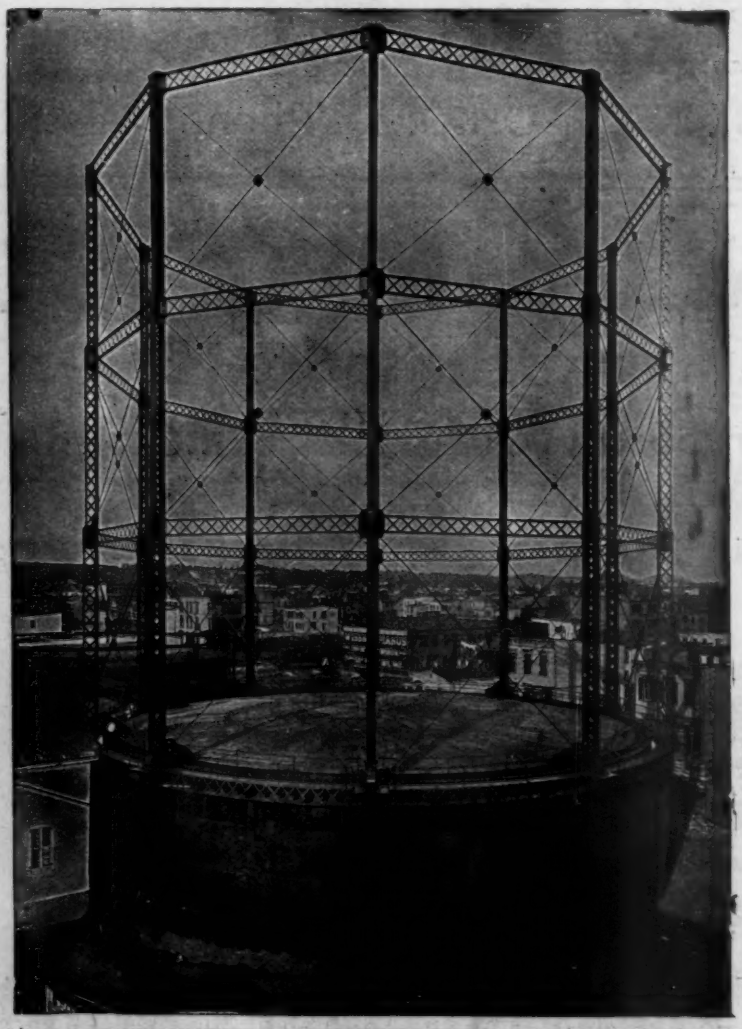
Office, No. 39 Laurel Street, Philadelphia, Pa.

BUILDERS OF

Gasholders

Single or Telescopic. With or Without Iron or Steel Tanks.

OIL TANKS, WATER TANKS, AND GENERAL WROUGHT IRON WORK.



The order for this Triple-Lift Holder and Steel Tank was received by the Logan Iron Works from the Union Gas Light Company, of East New York. The contract was completed and the Holder was in actual use in 90 days from receipt of order. Capacity of Holder, 500,000 Cu.Ft.

LOGAN IRON WORKS,

Brooklyn, N. Y.,

MANUFACTURERS OF

Single or Multiple-Lift

GASHOLDERS,

Complete, with Steel Tanks.

BENCHES, SCRUBBERS,
CONDENSERS,
PURIFIERS, IRON ROOFS,
AND ALL PARTS OF
GAS WORKS APPARATUS.

Contractors for Complete Works.

Gas Analyst's Manual,

By JAQUES ABADY, M. Inst. Mech. E.

(Incorporating F. W. Hartley's "Gas Analyst's Manual" and "Gas Measurement.")

Ninety-three Illustrations and Nine Folding Plates.
Bound in Handsome Half Leather. Price, - $6.50.

FOR SALE BY

A. M. CALLENDER & CO., - - 42 Pine Street, New York City.

Established 1854.

D. McDONALD & CO.,

MANUFACTURERS OF

WET AND DRY METERS, STATION METERS AND METER PROVERS.

ALSO MAKERS OF

THE GLOVER PREPAYMENT METER.

The amount of gas delivered for the coin can be instantly and positively changed without removing the meter or replacing any parts.

The gas registered agrees absolutely with the amount purchased by the coin.

WE HAVE MADE AND SOLD IN THE UNITED STATES

OVER 120,000 OF THESE METERS,

ALL OF WHICH ARE GIVING PERFECT SATISFACTION.

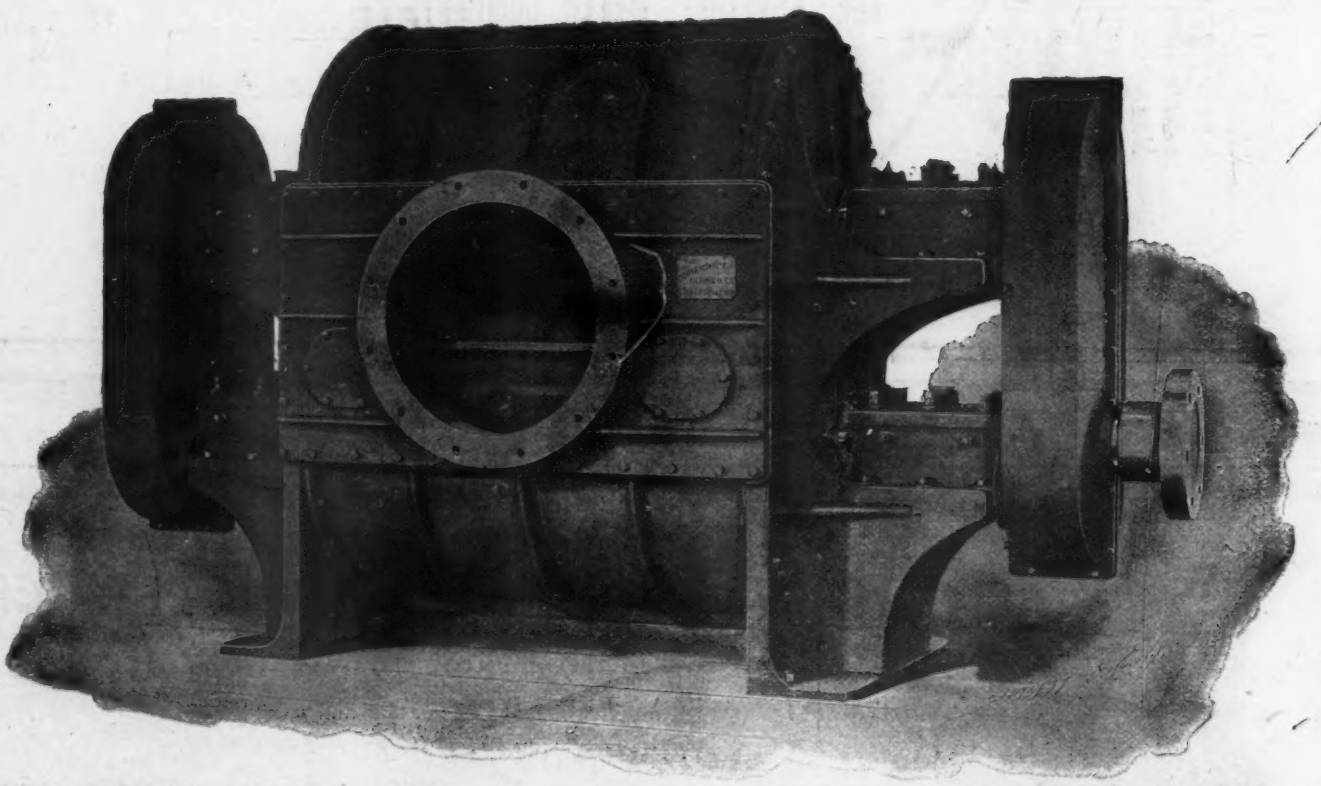
Correspondence Solicited.

561 West Forty-seventh Street, NEW YORK. | 51, 53 & 55 Lancaster Street, ALBANY, N. Y. | Jefferson and Monroe Streets, CHICAGO.

THE CONNERSVILLE BLOWER CO.,

MANUFACTURER OF

ROTARY POSITIVE PRESSURE GAS EXHAUSTERS, BLOWERS AND PUMPS.



HORIZONTAL OR VERTICAL, IN CAPACITY RANGING FROM 9,000 to 1,800,000 CU. FEET DISPLACEMENT PER HOUR.

CONNERSVILLE BLOWER CO., Connersville, Ind. EASTERN SALES OFFICE: 95-97 Liberty St., New York City.

NATHANIEL TUFTS METER CO.,

ESTABLISHED 1849.

8 MEDFORD STREET, BOSTON, MASS.

Consumers' Dry Gas Meters.
Station Meters of Any Capacity.

PREPAYMENT GAS METERS.

MARYLAND METER CO.,

BALTIMORE, North and Saratoga Streets. **CHICAGO, 88 to 92 Jackson Boulevard.**

CONSUMERS' AND STATION METERS, PRESSURE GAUGES, ETC.

SPECIAL ATTENTION GIVEN TO ALL REPAIR WORK.

"Have you Seen our Complaint Meter?"

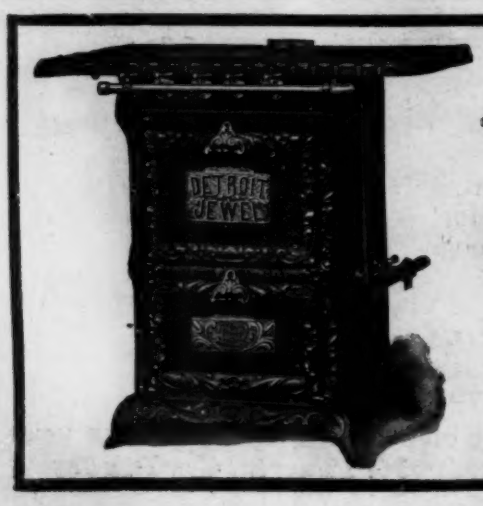
THE KEYSTONE METER COMPANY,

ROYERSFORD, PA.

Regular Meters and Prepayments,

AND REPAIRING.

"Stick to business and keep a-yellin'."



DETROIT STOVE WORKS

"Largest Stove Plant in the World"

MANUFACTURES AND SELLS

DETROIT JEWEL GAS APPLIANCES

FOR COOKING and HEATING,

All about which is told in a fine and strictly "to-the-point" catalog, sent upon request to Gas Companies.

DETROIT, MICH. CHICAGO, ILLS.

AMERICAN METER COMPANY,

NEW YORK, PHILADELPHIA, CHICAGO
SAN FRANCISCO, ST. LOUIS.

PREPAYMENT METERS.

THEIR CONSTRUCTION IS SUCH THAT THEY MAY BE READILY READJUSTED WHEN THE SCALE OF GAS RATES IS CHANGED.

HELME & McILHENNY,

Established 1848. 1339 to 1349 Cherry Street, Philadelphia, Pa.

MANUFACTURERS OF

Wet and Dry Gas Meters, Station Meters, Provers, Gauges, Etc.

METERS REPAIRED

PREPAYMENT GAS METERS.

Our Own Patents Strong. Simple. PROMPT ATTENTION CORRESPONDENCE SOLICITED

METRIC METAL COMPANY;

MAKERS OF

GAS METERS for NATURAL and ARTIFICIAL GAS.

Special Attention given to Repairing METERS of all Makes.

FACTORY AT ERIE, PA.

This is the best time to look after your repairing.

Seventy per cent. of old meters run slow. You are losing money on them. Let us put them in shape for you, a few at a time, until your entire meter equipment is made as good as new. It is better to attend to this matter now, before the Gas Stove season is at its height. Probably we can do such work in our factory better and cheaper than you can do it at home, and just now we can do it promptly.

The BUHL METERS are as good Meters as you can get.

DETROIT METER COMPANY, = = Detroit, Mich.

When you want a gas valve that's strictly A No. 1 in every respect== a valve that's bringing in lots of repeat orders from the largest Gas Companies in America (from the Companies that test their valves)==YOU WANT A "WESTERN."

This valve is ALL iron.
All parts are interchangeable.
Valve is readily cleaned while in pipe line and under pressure, and is made in several styles and all sizes, up to and including 42 inches.

FOR PROMPT SHIPMENTS, WIRE US.

The Western Gas Construction Company,

GAS ENGINEERS AND BUILDERS,

Fort Wayne, Indiana.

SAN FRANCISCO. NEW YORK.